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ABSTRACT

This document contains descriptions of the methods used by three government agencies (National Institute of Mental Health, the U.S. Department of Agriculture, and the Office of Economic Opportunity) in managing practice-oriented research. Each agency is treated separately, with a presentation of the steps that its managers and researchers actually take in managing research activities. The descriptions were obtained by interviewing managers and other staff personnel in these agencies and interpreting their responses. The document is divided into an introduction and three sections for the three agencies. In the Department of Agriculture section, the main discussion centers on Cooperative Research Service paradigms. The National Institute of Health section focuses on the activities of applied research, coordinating centers, funded centers, and research and development. The shorter section on the Office of Economic Opportunity consists of an overview, summary, and description of activities. (JA)

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NATIONAL INSTITUTE OF EDUCATION: METHODS FOR MANAGING PRACTICE-ORIENTED RESEARCH AND DEVELOPMENT

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A WORKING NOTE
prepared for the

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

This Note was prepared to facilitate communication of preliminary research results. Views or conclusions expressed herein may be tentative and do not represent the official opinion of the sponsoring agency.

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PREFACE

This Working Note contains descriptions of the methods that the National Institutes of Mental Health, the U.S. Department of Agriculture, and the Office of Economic Opportunity use in managing practice-oriented research. These descriptions were obtained by interviewing managers and other staff personnel in these agencies and interpreting their responses. None of the descriptions have yet been returned to the agencies for their comment or approval. This will be done in the near future.

This work was done as part of the effort to plan the National Institute of Education (NIE). If authorized by the Congress, the NIE would conduct research and development in the field of education. This report is one of a series on the Institute. The others are:

- National Institute of Education: Preliminary Plan for the Proposed Institute (R-657-HEW)
- National Institute of Education: Methods for Managing Fundamental Research (WN-7676)
- National Institute of Education: Methods for Managing Programmatic Research and Development (WN-7678)
- National Institute of Education: Organizational and Managerial Alternatives (WN-7679)
- National Institute of Education: Evaluation of Methods for Managing Research and Development (WN-7680).

This report only describes the methods that the selected agencies use in managing practice-oriented R&D; it does not evaluate their relative merits. A comparative evaluation of these methods appears in WN-7680.

Many of the R&D managers interviewed during this study expressed the need for additional study of the methods used in managing non-military R&D in the Federal government. The literature on this subject is slight in comparison with the literature concerning the management of industrial and military R&D. The principal purpose of these reports, however, is to enable the planners of the National Institute of Education to benefit from the experience of other federal R&D agencies in developing the NIE's R&D management procedures.

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I. INTRODUCTION

PURPOSE OF THIS REPORT

This report describes eight methods that three federal agencies use in managing practice-oriented R&D.

The format of description will be to treat one agency at a time by (1) presenting the steps that its managers and researchers actually take in managing research activity, and then (2) repeating this presentation for the other agencies. The intention is to present the data on which the interpretive and evaluative statements made in WN-7679 and WN-7680 are based. This approach was taken because agreement on what people do is easier to get than agreement on the effects of their actions, or what they should do. Agreement on what R&D managers should do is difficult because it is ultimately a question of value.

The description for each agency will be called a paradigm, since not every detail and variant in what an agency does will be described. Each description is meant only as a model which depicts the essential steps in an agency's R&D management process.

A step is deemed essential if changing it would significantly alter an estimate of the basic philosophy underlying the R&D management process being described. By looking at the essential steps, it is easier to infer what the basic underlying philosophy is, and how to project it onto a new situation, like education R&D. This is, in fact, a meaningful definition of a paradigm; that is, the projection of something which is difficult to describe onto reality, where its consequences are observable and hence describable.

The paradigms which will be treated in this report are listed in Table 1 alongside the agencies using them.

Table 1

AGENCIES TREATED AND THE METHODS USED
TO MANAGE PRACTICE-ORIENTED R&D

Agency	Paradigm
U. S. Department of Agriculture	Experiment Stations Regional Research Projects Special Research Projects
National Institute of Mental Health	Applied Research Coordinating Center Funded Center Services R&D
Office of Economic Opportunity	Research and Evaluation

METHOD OF RESEARCH

The data used to construct the management paradigms were obtained by interviewing federal R&D managers. Roughly half of the people interviewed were program directors and the other half were supervisory and staff personnel. Exhaustive coverage of every manager in an agency was not attempted, but rather key personnel and those recommended by key personnel were approached for interview. Altogether 24 managers were interviewed, some on repeated occasions. In addition, some data from the academic literature and from agency documents were used. A list of the people interviewed will appear in the final version of this report.

The paradigms are a distillation of replies made by managers commenting on the nature and importance of their activities. Necessarily, this approach to research is vulnerable to biases and sometimes produces information that is difficult to verify. Nevertheless, by asking all managers similar questions, and by filtering the responses as objectively as experience made possible, a fair representation of reality is thought to be presented. This approach is within the tradition of naturalistic observation as a method of research.

To gain clarity of exposition, some of the auxiliary mechanisms used by some agencies to overcome shortcomings in their management processes were

omitted. Thus, matching the paradigm descriptions, the agencies interviewed, and the paradigm evaluations in WN-7680 to conclude that one agency does a better job of managing research than another agency is not justified.

TYPES OF R&D ACTIVITY

Practice-oriented R&D includes three sub-types of activity: research, development, and evaluation. Practice-oriented research is directed toward understanding the relationship of selected factors to phenomenon important to practice. Typical projects would be: determining the factors that effect teacher mobility, determining the factors that effect the rate of progress in programmed instruction, or proving relationships between leadership style and innovativeness in schools. In practice-oriented R&D, development is directed toward inventing a new product, system, or procedure that satisfies a need perceived by practitioners. Evaluation, in practice-oriented R&D, is directed toward understanding the extent to which, and why, specific R&D interventions into practice are working. Evaluations provide information that allows more informal choice among alternative courses of action.

Practice-oriented R&D is distinguished from fundamental research principally in the kinds of problems solved. In practice-oriented R&D, the problems solved are those faced by practitioners such as teachers, administrators, farmers, and medical doctors. In education, for example, the range of topics includes improving the methods of instruction, developing better curriculum,, improving the management of schools, creating new forms of schooling, and improving the training of personnel. In fundamental research, the problems solved are less directly derived from practice and more concerned with underlying natural phenomena. In education, examples of fundamental research studies would be measuring the perceptual capacities of infants, developing theories of language acquisition, and studying genetic effects on behavior.

In comparison to programmatic R&D, practice-oriented R&D is similar in some ways and different in others. They are similar in that both are concerned with solving practitioners' problems. They are also similar in that both include research, development, and evaluation as constituent activities. They are different in that programmatic R&D involves a larger scale, more

planned attack on a single problem. In most cases, programmatic R&D is used when the solution to a problem is urgently needed. Practice-oriented R&D is more directed toward advancing the state-of-the-art in problem areas of continuing importance to practice.

TYPES OF MANAGEMENT ACTIVITY

To facilitate presentation, the practice-oriented R&D management process will be broken into three types of activity:

- Program Planning,
- Program Development,
- Program Evaluation.

These categories are deliberately chosen to group together qualitatively similar management activities.

Program Planning management activity is defined to include all the actions taken to foster, detect, and incubate new and ill-formed programs. Also included are the procedures for deciding which new programs will be added to the set of ongoing streams of activity. One example of such a new area is OEO's effort to understand whether vouchers are a desirable means of financing and providing educational services. While this idea is based on concepts from pure economic theory, the whole range of effects which might occur from implementing the concept in practice have never been studied. In fact, the alternative means for implementing the concept had only been crudely considered prior to OEO's interest. Thus, educational vouchers are a wholly new idea for practice, not clearly superior to existing methods, but potentially of very great practical utility. These characteristics are typical of new program areas in practice-oriented R&D.

Program Development is defined to be the activity of managing the continuous process of refining and elaborating knowledge and practical capability in a program area. As a management process, program development is typically, though not always, *an iterative and continuing sequence of stages involving:*

- assessment of needs,
- generation of project ideas,

- o selection of projects to support,
- o monitoring of project performance,
- o evaluation of project outcomes, and
- o utilization of results.

In various management paradigms, these stages are managed in different ways. Sometimes they are done by program directors, sometimes by panels of scientists, and sometimes not at all. In most of these stages action proceeds concurrently in several of the stages. This activity is called Program Development because from program management's perspective, practice-oriented R&D is evolutionary and expositional in nature. The goal is adding fine structure and precision to a basic idea, and this happens through a sequence of project generation, project selection, and outcome events that unfold over a period of time.

Program Evaluation is the management activity of assessing what performers have accomplished at some point in time and the judgment of what ought to be done next. Ways in which agencies accomplish this management activity is the third topic which will be discussed in this paper.

Discussion of management methods will focus on what is done at the *program director's* level, and only occasionally at the upper levels. This is necessary because of the decision to describe procedures that managers use in practice. Interactions at the higher levels are more political, and thus subject to greater variation and personality dependencies. Not much insight into ways of allocating a budget between R&D on teacher education and school administration is gained by looking at the *procedures* agencies use. The mysteries surrounding how these kinds of decisions are made is treated in the science policy and political science literature. Attention here will center on what goes on at the interface between the performer and his immediate manager. In some agencies this latter individual is called a program officer, or science administrator.

II. U.S. DEPARTMENT OF AGRICULTURE

OVERVIEW

The U.S. Department of Agriculture (USDA) has managed a large-scale R&D system for a longer time than any other federal agency. USDA began supporting research at its inception in 1862. At the present time there are six research services in three agencies supporting agricultural R&D. A list of these services appears in Table 2.

Table 2

RESEARCH SERVICES IN THE U.S. DEPARTMENT OF AGRICULTURE

Agency	Service
Science and Education	Agriculture Research Service Cooperative State Research Service
Agricultural Economics	Economic Research Service Statistical Reporting Service
Rural Development and Conservation	Forest Service Research Farmer's Cooperative Service

Only the Cooperative State Research Service (CSRS) will be described in detail in this report.

In addition to the agencies listed, there are two other USDA agencies that do not support R&D: International Affairs and Commodity Programs, and Marketing and Consumer Services.

Agriculture's R&D system has three major segments. One is intramural research, which was started in USDA's first year. Since then it has been used as a means for improving agricultural practice and providing a scientific basis for establishing agricultural regulations. Most of the intramural research in USDA is managed by the Agriculture Research Service (ARS). Currently, ARS includes more than 4,500 scientists in 150 laboratory locations across the country, requiring an annual expenditure of over $170 million.

The second major segment of Agriculture's present R&D system was added by the Hatch Act of 1887. This act provided for State Agricultural

Experiment Stations (SAES) at the land grant colleges. These institutions were to be a means of focusing research on the problems of a region and coupling this research with the education function of the land grant colleges. The experiment stations are funded by USDA's Cooperative State Research Service and by other federal and state agencies. Currently, there are 53 SAESs receiving $56 million from CSRS, $29.4 million from other federal agencies, and $138 million from state agencies. In addition industry contributes $11 million.

The SAES segment of Agriculture's R&D system contains three subsegments, which have been added at separate times over the years. The largest subsegment (currently about 95 percent of the state and federal funds spent by stations) comprises projects undertaken by researchers at the station because of their own scientific interest or because a problem exists in the state that the station serves. These projects are supported by money alloted to the states on a formula/matching basis by the federal government or from state appropriations. By design, there is very little federal or regional (multistate) control that can be exercised over the allocation of this money. These projects are the oldest experiment station activity, descending in concept from the first two experiment stations established in Connecticut in 1875 and North Carolina in 1877. The original intention of the North Carolina station was to answer farmers' questions about commercial fertilizers by using the "latest achievements in science."* This purpose has been repeated and continued in principle in every subsequent station. This subsegment of activity will be called Experiment Stations research.

The second largest subsegment of the SAES program is Regional Research Projects, which was added in 1955. The Station Directors and Congress came to realize that common problems existed among the states, but too often each state was working independently in solving them. Regional Research Projects, in which a group of scientists from the

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*U.S. Department of Agriculture, *After A Hundred Years: The Yearbook of Agriculture, 1962*, G.P.O., 1962, p. 26.

several states plans a research project together, was instituted to correct this deficiency. At first the scientists controlled these projects, but in recent years the Directors have begun to use them as a principal lever for setting research priorities in the entire system of the stations. About five percent of the budget in SAESs is allocated to Regional Research Projects.

A third subsegment of the experiment station activity, called Special Research Projects, has been added more recently. The purpose of Special Research Projects is to mobilize available talent quickly in response to a critical problem that must be solved in a short time. Both the formula-supported projects and the Regional Research Projects have turned out to be inadequate to this task. A recent example of such an effort is the crash program to solve the corn blight problem. Less than five percent of the federal support to SAESs is spent on Special Research Projects.

At the federal level these three subsegments are managed by the Cooperative State Research Service, an agency in the Science and Education directorate of the U. S. Department of Agriculture. Because it facilitates understanding they will be described as three distinct programs within CSRS. But, there is danger that each will be be seen as a separate activity. CSRS stresses the opposite case; that the three are highly interrelated. It is a tenet of management in CSRS that none will function well without the other in place.

The third major segment of Agriculture's R&D system is the Extension Service, which was authorized by the Smith-Lever Act of 1914. In the early 1900s the SAESs had begun to recognize that simply doing good research, even practice-oriented research, was not enough to guarantee its implementation in practice. A large effort to publish and distribute R&D results in written form had not worked, nor had attempts at sending out researchers to lecture farmers. The method that has been used by the Extension Service has proven to be much more successful in increasing the rate at which research results are adopted than the old methods. The Extension Service method is to provide at least one agent for every county or county-sized area of the county who

is responsible for solving problems brought to him by people in his area, and also showing people that they have problems. At present there are 11,000 of these county agents throughout the country. When one of these county agents needs information about how to solve an agricultural or community problem in his area, he contacts the SAES to which he is administratively linked. The agent's points of contact are the extension specialists, who work in each SAES. On the average there are 80 extension specialists per SAES. Each specialist is responsible for knowing all the significant research results in a limited problem area that have been produced at his own station or at any other station or agricultural research laboratory. The specialists respond to agents' requests in a variety of ways from sending literature to making a personal visit. For difficult problems, the specialist may arrange to have station researchers sent to the field, or have a project to solve the problem begun in the SAES. USDA believes that county agents must have this research base available if they are to be successful in improving practices in the field.

The extension function is funded by USDA through its Extension Service, which is part of the Science and Education agency, and by state and local government, which must match the federal contribution. There is also a counterpart of the federal Extension Service called a State Extension Service associated with each SAES. These State Extension Services administer the county agent program, and coordinate program thrusts at the county level that are initiated at the federal level by the Extension Service.

While the county agent's roles are crucial in the Agriculture R&D system, they will not be discussed further in this report except insofar as they interface with SAES research programs. This restriction is necessary because this report is limited to systems for managing R&D.

CSRS's system of SAESs is unique among federal agencies in several respects.

- First, the system includes a *full range of interconnected R&D activities*. The range covers Research, Development, and Extension. CSRS believes that without Research and Development, Extension withers in effectiveness; and without Extension, R&D strays from

solving "real" problems. Performers in each of these activities are administratively linked together or collocated according to patterns worked out over a period of time. These patterns vary over the country, but they are much more uniform and established than in any other R&D system.

- CSRS *funding is institutional* in nature, and is not to any large extent awarded by project. About half of the R&D money goes to stations by formula and most of the rest is spent intramurally.
- The agricultural *experiment stations are funded jointly* by the states, the federal government, and private sources. Whereas only one-to-one matching is required, non-CSRS sources actually supply four times the federal contribution.
- In the experiment stations, almost all *personnel perform two or three roles in the R&D system.* The primary roles performed are: research in the station, teaching in the university, and providing extension services for the field.
- The basic work unit is a *multidisciplinary, problem-oriented team* composed of both basic and applied scientists working on a specific agricultural or community problem.
- Unlike other federal agencies, CSRS funds *no scholarships or training grants.* Students work as assistants on research projects, but there are no direct instruments employed for research training.

SUMMARIES OF COOPERATIVE RESEARCH SERVICE PARADIGMS

EXPERIMENT STATIONS

General Characteristics

Primary output:	Additions to knowledge about agricultural problems, and products or techniques that advance agricultural practice. Much of this R&D is directed to local problems within a state.

Mechanism of support:	The station director receives population-based formula funds from the federal government and regular state appropriations, which he allocates to projects in the station.
Managerial emphasis:	At the federal level control of program development is exercised by conducting program evaluations. Program and project planning is done by scientists at the working level in cooperation with peers, supervisors, and extension personnel.
Staffing plan:	Most station researchers have split assignments; conducting research and teaching in the university. This is possible because all stations are collocated with a land grant university. At the federal level, program managers serve full time. Most have a background in experiment station research.

Program Planning

Sources of new program ideas:	Each station is active in most program areas, so new programs rarely start. Most new programs result from user group pressures.
Mechanism for planning:	No formal mechanism employed.
Coordination:	Peer group communications and Regional Research Projects program are principal means of coordination.

CSRS has little control over program priorities.

Program Development

Sources of project ideas: Scientists develop their own project ideas in consultation with peers, program leader, department chairman, and station director.

Means of proposal review: Scientists prepare a Project Outline for each project they undertake. The Project Outline is a charter agreed to by department chairman, station director, and CSRS program director.

Allocation of budget: Little direct federal influence. Station director is final authority.

Monitoring of performance: Not done formally.

Evaluation of outcomes: Project Outlines have finite lifetime, after which review process is repeated.

Program Evaluation

Mechanism of evaluation: Two-day site visit by CSRS program director and scientific peers.

Timing of evaluation: Each program is evaluated a minimum of once every four years.

Implementations or results: Review is conducted in interactive style between site visit team and the station's researchers. Intent is that researchers will meld reviewers' comments with their own judgments in planning projects. Station directors see the review results, too.

REGIONAL RESEARCH PROJECTS

General Characteristics

Primary output:	Additions to knowledge about multistate agricultural problems and products or techniques that advance agricultural practice.
Mechanism of support:	The station director receives formula funds from the federal government to spend on projects in which several states perform cooperatively.
Managerial emphasis:	Regional projects are a means by which the Regional Associations of Directors and CSRS influence the directions of agricultural research in the state agricultural experiment stations.
Staffing plan:	Regional projects are performed by experiment station researchers working in their own labs, and managed by a committee of representatives from each of the participating stations. Intra-project priorities are set by the station directors.

Program Planning

Sources of new program ideas:	The Regional Associations of Directors select top priority problem areas for development into regional projects.

Mechanism for planning: Task forces of scientific leaders are convened to sketch out desirable projects in each program area.

Coordination: Principal responsibility of the CSRS program director serving on a task force is to bring knowledge of all current activity relevant to the planning sessions. CSRS has no control, however, over program priorities.

Program Development

Sources of project ideas: Within a regional project, which is almost large enough to qualify as a program, individual sub-projects are generated by a Technical Committee of representatives from each participating station.

Means of proposal review: The Project Outlines prepared by the Technical Committee are reviewed first by the Regional Research Committee and the Regional Association of Directors, and then at the federal level by the Committee of Nine, a national level committee of Directors. CSRS assists the Committee of Nine in its review responsibilities.

Allocation of budget: During the preparation of the Project Outline each station director decides how much of his formula-fixed budget of regional funds to spend on each project.

	When added up, all his regional commitments must match the supply of funds available from CSRS.
Monitoring of performance:	The Technical Committee and Administrative Advisor, an appointee of the Regional Association of Directors, are responsible for monitoring performance. The Committee of Nine reviews each project one or two years after its initiation.

Program Evaluation

Mechanism of evaluation:	No means of evaluation is employed.

SPECIAL RESEARCH PROJECTS

General Characteristics

Primary output:	Rapidly achieved solutions to critical national or regional problems.
Mechanism of support:	Finite duration grant to project team.
Managerial emphasis:	An intensive effort is made to determine research priorities before awarding grants. This is done cooperatively by CSRS and potential participants.
Staffing plan:	Most of the performers are station researchers who defer other projects to work part- or full-time on the special project.

Program Planning

Sources of new program ideas:	No formal mechanism for detecting problems. Reliance placed on usual internal and external communications.
Mechanism for planning:	Program director assigned full-time to problem. He runs a conference of potential performers to explore priorities for spending research money on the problem, and investigates the question himself.
Coordination:	Program director links to similar efforts by companion agencies.

Program Development

Sources of project ideas:	Potential performers submit their ideas when requested by the program director.
Means of proposal review:	Program director and agency staff evaluate prospective performers based on quality of ideas contributed in planning stages and competence to solve their assigned problem quickly.
Allocation of budget:	Ultimately decided by program director; but conference of the station directors which will most likely be doing the work is run to assist in setting priorities among sub-tasks.
Monitoring of performance:	Program director keeps in weekly contact.

Evaluation of outcomes: Not done in formal way.

Program Evaluation

Mechanism of evaluation: Not done in formal way.

EXPERIMENT STATIONS PARADIGM

Program Planning

The total research activity of the state agricultural experiment stations has been divided into 98 problem-oriented research categories by the USDA. Each of these categories is called a program, but since work is largely planned at the scientist level, programs are more a managerial artifice than coherent, coordinated sets of projects. Typical examples of these "programs" as they are defined at the federal level are:

- Management of salinity and saline soils
- Appraisal of forest and range resources
- Control of insect pests of field crops
- Improvement of biological efficiency of fruit and vegetable crops
- New and improved meat and dairy products
- Causes and remedies of poverty among rural people.

Each program is an aggregate of all the projects conducted in all the state stations that fit the program's definition for inclusion. Any one station typically has a few projects in almost every program; but there is no organized attempt to coordinate projects in the same program in different stations with each other. Each station plans its own version of the programs on which it is active, often combining several of them into one. As a consequence, a station's programs do not necessarily correspond one-to-one to the categories set down by USDA. A station's research activity might better be described as a collection of overlapping program areas.

The organization of a state station more closely resembles a collection of overlapping groups than a rigidly compartmentalized and hierarchical arrangement. Projects consist of one or more of the station's researchers

working on a part-time basis. A mixture of disciplines may be involved in a project. The rest of the time these researchers are working on other projects, teaching in the university, or serving as extension specialists.

Since each station has some projects in most of USDA's 98 program areas, new programs are rarely started. For this among other reasons, Program Planning, as the term is used here, is not a frequent activity.

But when he needs to, the station director has substantial, but certainly not unlimited, authority to start new programs.

His authority is checked mostly by budget restrictions. The station's budget is an aggregate of funds from a variety of sources, principally the federal government, state government, and industry. The station's federal funds are determined by a formula based on rural population, so the director is virtually free of federal control in allocating this money. The remainder of the station's money comes as appropriations from the state government, or as grants or contracts from industry. Support from either of these sources can be increased if an attractive new program is offered.

Program Development

Most of the research activity in a state experiment station falls in the category of Program Development.

The process receives its basic direction from the ideas developed by scientists at the working level rather than from the station director or other administrators. However, the scientists are influenced in their generation of ideas by many sources.

The first source is the extension specialists, who are collocated with researchers and every day ask them questions derived from practitioners' problems. These questions influence the researcher's choice of problems to work on.

Another source is the station director, who may urge the researcher to a different research approach because of problems the director has encountered in his travels and discussions. For example, the objective that researchers pursued in pesticide research for years was to maximize persistence and lethality. Now, the directors are changing this to

shorten persistence, and minimize the amount of substance applied.

A third source, and often the most frequent one, is research program leaders. Within a station there are a number of senior researchers who function as "program leaders." Generally there is one program leader per ten researchers in each station. They are of two principal kinds: (1) those who are semi-officially designated as such (it is written into their job description), and (2) those who have mastered a broad field of agricultural science and act as gatekeepers. These individuals assume responsibility for coordinating and shaping the research program in their area.

As the first steps in gaining approval for a project, a scientist (or scientists) writes up his (their) idea in a format called a Project Outline.

CSRS requires that, in no more than a few pages, a Project Outline should:

(1) Justify the importance of the selected problem to the agriculture of the state, and science,

(2) Summarize previous, pertinent work on the problem,

(3) State research objectives in logical order,

(4) Indicate experimental methods that will be used, and

(5) Estimate resource requirements.

The Project Outline is a charter between the station and the proposing researcher to conduct research in a delimited area for a finite number of years (usually less than five). At the end of this period, or sooner if changes are needed, the Project Outline is rewritten. In writing the Project Outline, scientists consult with appropriate program leaders and the director's office, and work out a compromise that balances the interests of the station with the interests of the researcher.

Once the station director, the appropriate program leaders, the researcher's department head, and the researcher agree on a Project Outline, it is sent to CSRS in Washington, D. C., for review and approval. CSRS reviews all Project Outlines in the same way whether the project is federally or state funded. The appropriate CSRS program director reads the Project Outline, checking mostly to see if the proposed work is mundane,

obsolete, ill-conceived, or amounts to research on methodology not clearly related to an agricultural problem. Fine lines over what is and what is not acceptable have developed over the years. For example, with respect to the last criterion, research on soil testing methodology is appropriate, but research on the foundations of probability is not. The program director vetoes Project Outlines he thinks are too weak to merit support.

The program director does not veto very many Project Outlines, just enough to keep the system honest. Typically, five percent or fewer are vetoed. From experience, the program director knows that if he vetoes many proposals, the station is likely to fund most of the vetoed projects from its other sources to emphasize its autonomy. There is no legal authority granting veto power to the program director, simply the statement that the "Secretary is charged with proper administration of this Act..." The understanding that has been reached between CSRS and the stations is representative of the mode of operation of the agriculture R&D system. Management is viewed as a cooperative enterprise in which all parties should have a voice.

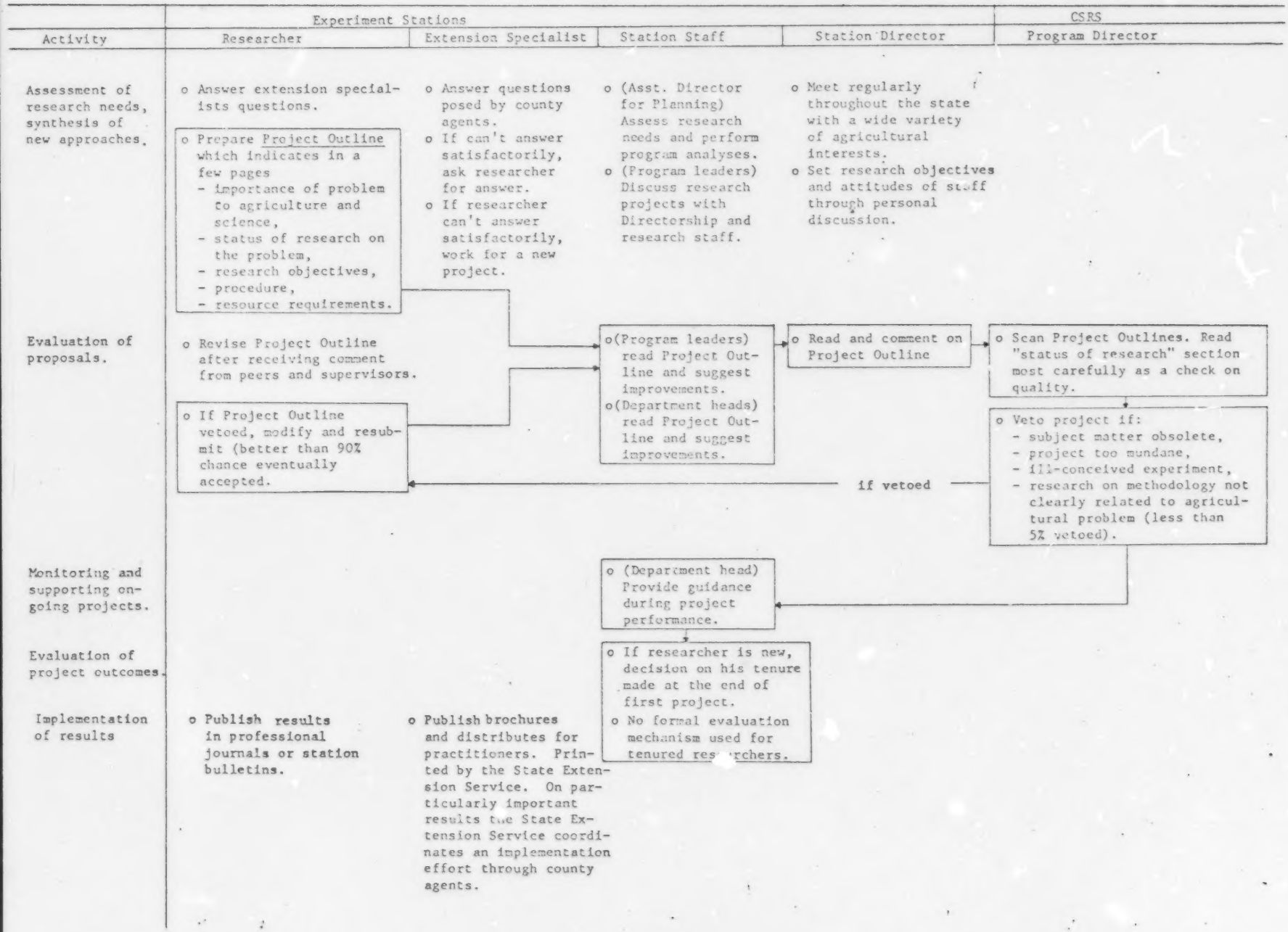
Vetoed proposals are reworked by the proposing researcher, or research team, as the case may be, and resubmitted. More than 90 percent of all Project Outlines resubmitted are eventually approved.

Once a project is accepted by CSRS, monitoring and supporting performance is the responsibility of the station staff, particularly the program leader and the department chairman. No formalized method of reviewing performance has developed over the years.

Project outcomes are evaluated at the expiration date of the Project Outline. A researcher's output, the need for more of the same work, and other factors are reviewed informally by the researcher's peers and supervisors. A decision is then made to continue the Project Outline or submit a modified one. "Newly hired" researchers receive a more severe evaluation at this stage than researchers up for renewal, since a decision on tenure in the department is made at the same time. Tenured researchers are more likely to renew their old Project Outline without significant change.

A diagram of the program development process appears in Figure 1.

Figure 1: Program Development in Experiment Stations


Experiment Stations
CSRS
Activity
Researcher
Extension Specialist
Station Staff
Station Director
Program Director
Assessment of research needs, synthesis of new approaches.
o Answer extension specialists questions.
o Prepare Project Outline which indicates in a few pages
- importance of problem to agriculture and science,
- status of research on the problem,
- research objectives,
- procedure,
- resource requirements.
o Answer questions posed by county agents.
o If can't answer satisfactorily, ask researcher for answer.
o If researcher can't answer satisfactorily, work for a new project.
o (Asst. Director for Planning) Assess research needs and perform program analyses.
o (Program leaders) Discuss research projects with Directorship and research staff.
o Meet regularly throughout the state with a wide variety of agricultural interests.
o Set research objectives and attitudes of staff through personal discussion.
Evaluation of proposals.
o Revise Project Outline after receiving comment from peers and supervisors.
o If Project Outline vetoed, modify and resubmit (better than 90% chance eventually accepted.
o(Program leaders) read Project Outline and suggest improvements.
o(Department heads) read Project Outline and suggest improvements.
o Read and comment on Project Outline
o Scan Project Outlines. Read "status of research" section most carefully as a check on quality.
o Veto project if:
- subject matter obsolete,
- project too mundane,
- ill-conceived experiment,
- research on methodology not clearly related to agricultural problem (less than 5% vetoed).
if vetoed
Monitoring and supporting ongoing projects.
o (Department head) Provide guidance during project performance.
Evaluation of project outcomes.
o If researcher is new, decision on his tenure made at the end of first project.
o No formal evaluation mechanism used for tenured researchers.
Implementation of results
o Publish results in professional journals or station bulletins.
o Publish brochures and distributes for practitioners. Printed by the State Extension Service. On particularly important results the State Extension Service coordinates an implementation effort through county agents.

Program Evaluation

Even though it is only peripherally involved in Program Development, CSRS influences it by conducting program evaluations. The means of doing this is a site visit by CSRS program officers and peer scientists.

The format of site visits has evolved over the years, and is still evolving because CSRS continually experiments with new techniques (they are experimenting now with non-paid reviewers). Fifteen years ago, the review was only financial, since CSRS program directors went over expenditure reports with the station director. It was then realized that financial review was a job for auditors, and that most of the problems could be solved with a decent project reporting system. The site visits were transformed into reviews of progress-to-date. This, too, was soon found to be unproductive. Now, the site visits concentrate on reviewing the planning process and looking into the future. All the time is spent discussing future direction for the programs.

The site review team consists of one CSRS program director, plus one CSRS visiting scientist; and, depending on the comprehensiveness of the review, up to four scientists from other stations. Reviews are conducted at a continuum of levels from individual programs (activity in one of the 98 categories) to comprehensive reviews of an entire station. The format is probably converging to a point nearer the comprehensive end of the scale.

CSRS's objective is to include the activity in every program category in every station in at least one review every four years.

Reviews are conducted in an interactive style and last for two or three days. The attempt is to review by dialogue rather than to sit in judgment, although this varies with the program director's style. Typically, the first session is a group meeting and then discussions are held with individual scientists. Most of the talk is about specific projects and where they are going next, but concern is at the program level. For example, the purpose of a review might be, "Should the X station still be involved in plant breeding?" But talk would be about ongoing and possible projects.

In order to avoid devoting time to the history of a station's program, the CSRS program director spends two or three months part-time before a site visit studying the station's current and past research program.

does this by extracting the station's whole research program from the Current Research Information System, a computerized information system, and by reading final reports. Summaries of this review are sent to the site visit team. CSRS suggests that stations prepare for the review, too. Although a report is submitted to the station director and CSRS, the biggest effect of site visits is on what the scientists decide to do in the future. Station scientists think about what's said and "meld the thoughts" in with their own. The result is reflected in the Program Development process.

CSRS chose this style of evaluation because its method for managing R&D is to recognize that R&D is a process involving many phases and performing instruments. Sometimes what is done managerially in one phase of the process will more strongly affect what happens in another phase than operating directly on the latter phase. Thus, evaluating the potential of research programs at multiyear intervals is believed to have as much effect on program development as would being strongly involved in project planning. Moreover, the conduct of regional research projects and special research projects will also be affected by such evaluation, even though they are not directly under scrutiny because the same scientific staff participates in them.

ORGANIZATION

Structural Relationships

The organization chart of a typical experiment station appears in Figure 2.

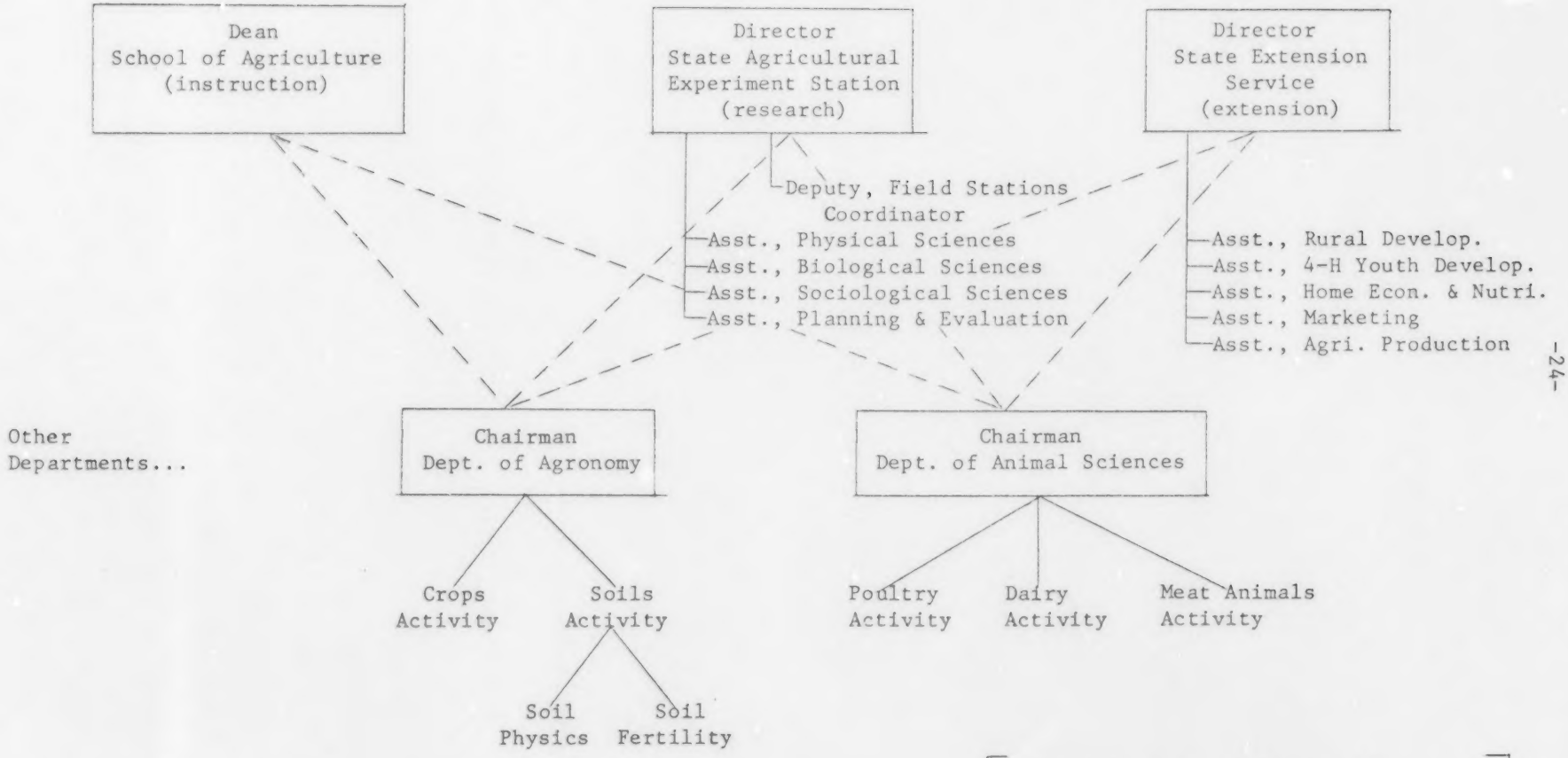
Staffing Relationships

CSRS Program Director. With rare exception, all have Ph.D. or equivalent degrees. Most come originally from the research bench in an experiment station. A portion of the assistants are scientists on visiting appointment.

Dean, School of Agriculture. The dean and his immediate staff are responsible for the instructional program of the university.

Director, State Agricultural Experiment Station. The director and his immediate staff are responsible for all research activity financed by the

Figure 2: Organization of a Typical State Agricultural Experiment Station



station. Very little other agricultural research is conducted by the university, although some departments, such as zoology, do related research.

The director is nominated by the station and approved by the Secretary of Agriculture. None has ever been disapproved.

Director, State Extension Service. The director and his immediate staff are responsible for managing the network of county agents, and responding to federal extension initiatives. They are also responsible for coordinating the work of the extension specialists as it relates to county agents' needs.

Department Chairman. Department chairmen are administratively responsible for station scientists and extension specialists in their department. In addition, the department chairmen coordinate the research activity in their departments, the extension activity, and the relations between extension and research. The department chairman reports to three people: the Station Director, the Dean of Agriculture, and the State Extension Director.

Station Scientists. Station scientists are assigned administratively to a department, but most have the dual role of teaching in the university and doing research. Normally, station scientists work simultaneously on two projects of their own and one cooperatively with two to four other scientists or extension specialists.

A job description agreement specifies the scientist's specific responsibilities as to division of labor, and managerial authority, but it prohibits pay for consultant services. The agreement is reached before a man is hired, and is a basis for performance review by the department chairman.

Extension Specialists. Extension specialists are assigned to a department. The extension specialist's responsibility is to keep up with what is known in his knowledge specialty, so that he can respond when county agents bring in a problem. To keep up-to-date, the extension specialist spends part-time doing research or teaching. His division of responsibilities is specified in a job description in the same manner as the scientists'. He is forbidden to receive extra pay for consulting.

REGIONAL RESEARCH PROJECTS PARADIGM

Program Planning

Regional Research Projects are a principal means of setting priorities in the experiment station's research program. The method is to select a problem that is important to a region or part of a region, and then have selected scientists from participating stations solve it cooperatively. Through the discussion necessarily generated, the selected scientists get a chance to set priorities in their own minds, and take into account what other stations are doing. Their attention is drawn to regionally important problems, and when they talk to their colleagues back at the station, this effect also transfers to nonparticipants. When the new thinking is reflected in proposals for formula-grant supported research, the priority-setting effect of regional research is achieved.

Until ten years ago, the ideas and impetus for regional projects came from the working scientist level, but now the Regional Associations of Directors play a primary role. While methods for planning regional projects are still being explored, one pattern the Regional Associations of Directors have followed is to set aside a portion of their quarterly meetings for discussion of important regional issues and to decide on a list of important regional problem areas. As a starting point, the directors sometimes use the 32 task force reports developed during the National Program of Research planning effort in 1966. Another source is issue papers drawn up by the Regional Association's staff, the Regional Research Committee. Each year, the directors choose one or two problem areas for further development.

The Regional Association of Directors then appoints a task force of department chairmen and leader scientists for each problem area selected. The task force members are selected on the basis of recognized scientific excellence and breadth of view. The task force's job is to decompose the problem area into a set of research objectives, each one to be a candidate for a regional research project. The task force indicates priorities among the projects suggested, and estimates the resources most likely to be required for each one.

In the meantime, each director compiles his obligations for regional research activity during the coming year, and sends it to CSRS. CSRS computes the difference between Regional Research Funds already committed by all the directors and the amount available from Congress, and distributes the surplus to each station in proportion to the previous year's allocation. Thus, each director knows how much of a commitment he can make to new regional research activity.

The task force's report is reviewed by the Regional Research Committee, and then both reports are submitted to the Regional Association of Directors. The assembled directors weigh the list of projects recommended by the task force and the RRC. They select a subset of these projects that includes those felt to be the most important ones and that just exhausts the supply of available regional funds. An administrative advisor is appointed for each of the selected projects and he is authorized to call the first Technical Committee meeting. A diagram of the planning process appears in Figure 3.

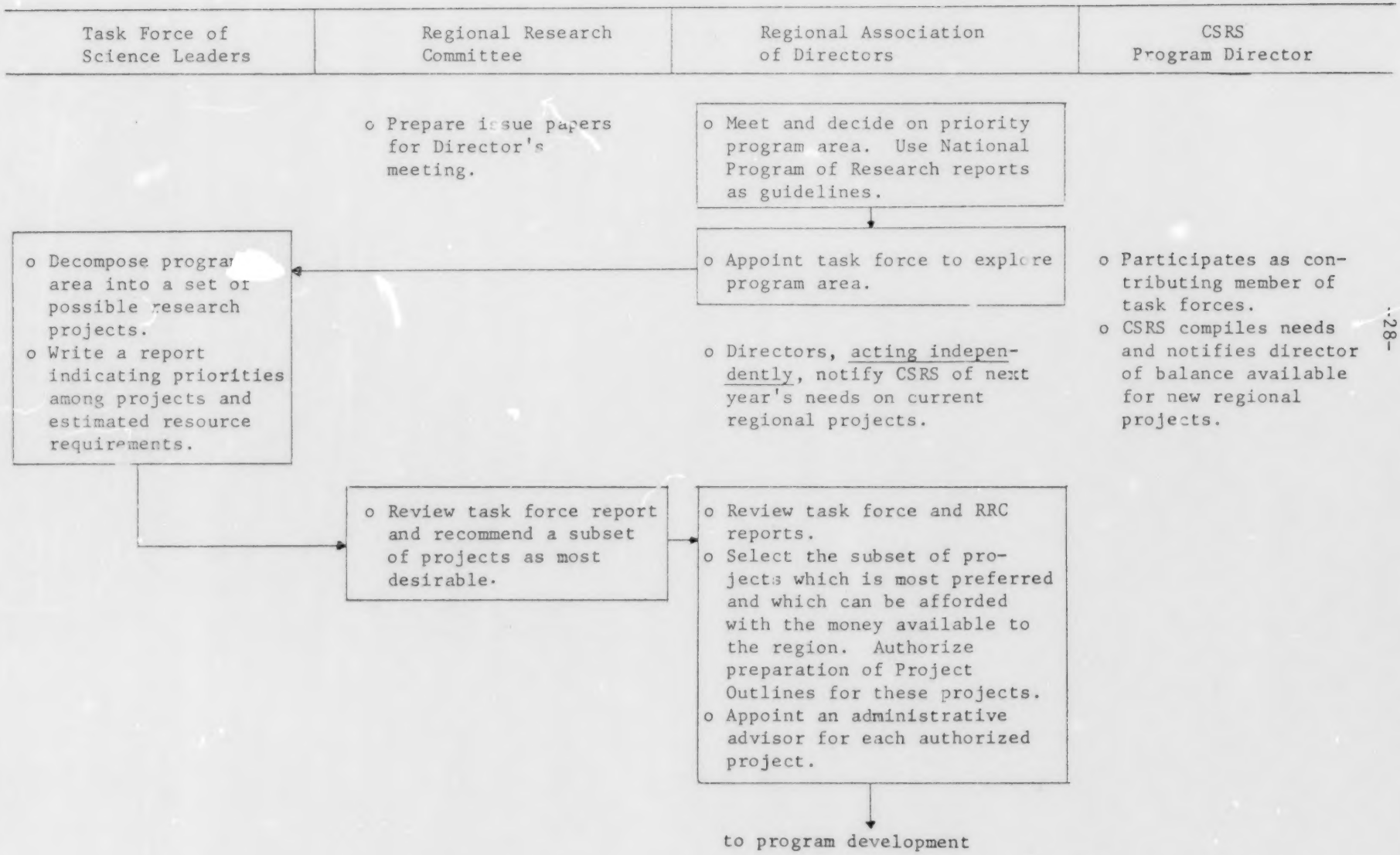
CSRS influences the planning process by having one of its program directors serve as a contributing member of the task force. This program director is technically qualified and brings CSRS priorities and perceptions to the planning activity.

Program Development

The Program Development process is managed to a large extent by a Technical Committee composed of representatives from the participating stations. Each station director appoints one or more representatives to the Committee after spending considerable time discussing possible members with the administrative advisor of the project. The Technical Committee meets for the first time at the call of the administrative advisor.

The administrative advisor introduces the Committee members to regional research, describes the project's history and objective, and emphasizes that the Committee's concern should be with technical matters, not the allocation of monies to stations. At the first meeting the Committee discusses specific sub-subproblems of the assigned overall problem, ranks these subproblems by importance to agriculture and their amenability to regional research. Each representative indicates his

Figure 3 : Program Planning for Regional Projects


Task Force of Science Leaders
Regional Research Committee
Regional Association of Directors
CSRS Program Director
o Prepare issue papers for Director's meeting.
o Meet and decide on priority program area. Use National Program of Research reports as guidelines.
o Appoint task force to explore program area.
o Participates as contributing member of task forces.
o CSRS compiles needs and notifies director of balance available for new regional projects.
o Directors, acting independently, notify CSRS of next year's needs on current regional projects.
o Decompose program area into a set of possible research projects.
o Write a report indicating priorities among projects and estimated resource requirements.
o Review task force report and recommend a subset of projects as most desirable.
o Review task force and RRC reports.
o Select the subset of projects which is most preferred and which can be afforded with the money available to the region. Authorize preparation of Project Outlines for these projects.
o Appoint an administrative advisor for each authorized project.
to program development

interests and then a tentative sketch of the regional project is produced. Sometime during the first session a chairman and other officers are elected by the Technical Committee members. From then on, Technical Committees are run by the elected chairman.

The Committee's next task, done over a period of months, is to develop a detailed project plan, called a Project Outline. The Project Outline specifies project duration (not more than five years), objectives, procedure, current and previous work, and organization. The procedure section should indicate initial plans to achieve each project subobjectives methods for collecting data, schedules, and means of coordinating activity. The allocation of tasks and responsibilities to stations participating in the project must be explicitly stated.

CSRS influences the Program Development process through its delegate on the Technical Committee. CSRS makes the representative responsible for knowing the state-of-the-art in the problem area of the project, and by employing this knowledge to keep the Technical Committee from being captured by a strong personality or from straying off the track.

Each representative must discuss what resources his station will commit to the project with his station director before it is included in the plan. A good deal of bargaining can occur over this matter, for the station director must allocate his fixed regional funds to several regional projects optimally, and the researcher usually wants maximum participation. The administrative advisor, a delegate of the Regional Association of Directors, plays a coordinating role in setting the allocation of tasks among the stations. He tries to see that tasks go where competence lies.

Completed Project Outlines are sent to the Regional Research Committee for preliminary review and then to the Regional Association of Directors. Changes desired by the Directors are incorporated by the Administrative Advisor, and then Project Outlines are sent to the Committee of Nine, which is the legal authority for paying regional projects.

Incoming Project Outlines are assigned to one Committee of Nine member, and a CSRS program director for in-depth, written review. In writing his review, the Committee of Nine member can employ any consultants that he pleases, even the opinions of CSRS. In the Committee meeting,

proposals are discussed in turn, and then a decision made to approve, disapprove, or conditionally approve by majority vote. The Committee rarely disapproves a project, but frequently gives only qualified approval. For example, the Committee might grant approval for only one year instead of five, with the stipulation that particular issues be resolved by the end of that year. Or, the Committee might eliminate parts of the Project Outline. In total, the Committee declines enough proposed work to keep the planning activity earnest. The vigor with which the Committee reviews Project Outlines varies greatly with its constitution, a matter over which CSRS has no control.

Upon receiving the Committee of Nine's approval, the station directors initiate work on their portions of the regional project. During project performance the administrative advisor carries much responsibility for keeping the project on schedule and working to the Project Outline. He confers with the CSRS program director on the project, checks on the adequacy of participation, and counsels individual researchers. He is responsible for calling at least one meeting of the Technical Committee per year or more if needed.

At these meetings, the Technical Committee reviews progress of participating scientists to see if it conforms with planned objectives and procedures. To assist in this review each participant is required to send a written report of his results to all the Committeemen before the review session. The Committee also discusses the work planned for next year and the desirability of changing the work schedule written in the Project Outline. If reallocation of a station's resources are required, the administrative advisor negotiates the differences with the station director. A third item of business is review and approval of the project's annual report, which is prepared in advance by the chairman. The approved report is sent by the administrative advisor to CSRS, the Regional Research Committee, and the Directors.

The Technical Committee also designates one of its members or the chairman as Project Coordinator. On large projects the Committee may hire a Project Coordinator. The coordinator's job is to maintain contact with the cooperators through correspondence and personal visits. He assists in the preparation of experimental protocols so that findings will blend into a regional analysis, and participates in the assembly and analysis

of data to assure uniform procedures.

The CSRS program director's responsibility in the regional project's development phase is to assist the administrative advisor in performing his role by maintaining close personal relations and a mutual understanding of project evaluations and problems. The CSRS program director and the administrative advisor are the chief communicators between the researchers, directors, cooperating agencies, and CSRS.

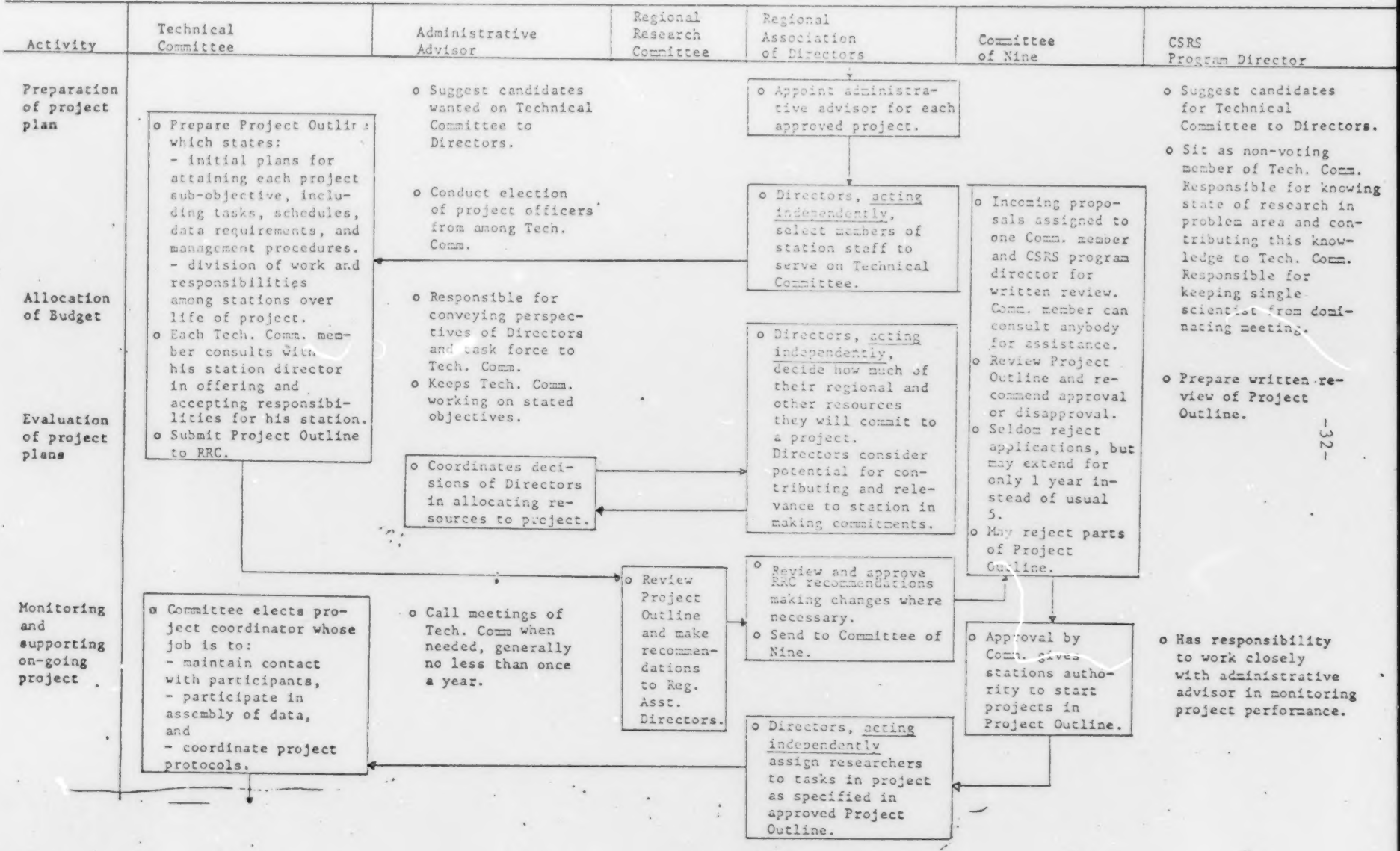
When the project is one year from termination, the Technical Committee must decide whether, during the next five-year period, the project should be terminated, extended with the same Project Outline, or revised and performed under a modified outline. The administrative advisor is responsible for organizing the required meetings and assignments for executing this task. If the Project Outline is to be significantly changed, the process is not unlike the one followed in preparing a new Project Outline. If the changes are minor, shortcuts in this procedure are in order. In any case, both requests for extension and revised Project Outlines must go through the same evaluation steps as first-time proposals. Requests to merely extend the Project Outline are not received by the Committee of Nine.

The administrative advisor is also responsible for seeing that the Technical Committee publishes its findings broadly. Station publications, journal articles, and briefs are often used mediums. In addition, the Technical Committee must submit a final report at the end of its funding period.

Procedures for evaluating regional projects vary with the region and the project, with no clear pattern emerging except that after the first one or two years of a project's life the Committee of Nine reviews its progress. Their review is based on a report from the administrative advisor, and comments from the participating CSRS program director.

A description of the program development process appears in Figure 4.

Figure 4: Program Development for Regional Research Projects


Activity
Technical Committee
Administrative Advisor
Regional Research Committee
Regional Association of Directors
Committee of Nine
CSRS Program Director
Preparation of project plan
Allocation of Budget
Evaluation of project plans
Monitoring and supporting on-going project
o Suggest candidates wanted on Technical Committee to Directors.
o Appoint administrative advisor for each approved project.
o Suggest candidates for Technical Committee to Directors.
o Sit as non-voting member of Tech. Comm. Responsible for knowing state of research in problem area and contributing this knowledge to Tech. Comm. Responsible for keeping single scientist from dominating meeting.
o Prepare Project Outline which states:
- initial plans for attaining each project sub-objective, including tasks, schedules, data requirements, and management procedures.
- division of work and responsibilities among stations over life of project.
o Each Tech. Comm. member consults with his station director in offering and accepting responsibilities for his station.
o Submit Project Outline to RRC.
o Conduct election of project officers from among Tech. Comm.
o Directors, acting independently, select members of station staff to serve on Technical Committee.
o Incoming proposals assigned to one Comm. member and CSRS program director for written review. Comm. member can consult anybody for assistance.
o Review Project Outline and recommend approval or disapproval.
o Seldom reject applications, but may extend for only 1 year instead of usual 5.
o May reject parts of Project Outline.
o Responsible for conveying perspectives of Directors and task force to Tech. Comm.
o Keeps Tech. Comm. working on stated objectives.
o Directors, acting independently, decide how much of their regional and other resources they will commit to a project. Directors consider potential for contributing and relevance to station in making commitments.
o Prepare written review of Project Outline.
o Coordinates decisions of Directors in allocating resources to project.
o Review Project Outline and make recommendations to Reg. Asst. Directors.
o Review and approve RRC recommendations making changes where necessary.
o Send to Committee of Nine.
o Committee elects project coordinator whose job is to:
- maintain contact with participants,
- participate in assembly of data, and
- coordinate project protocols.
o Call meetings of Tech. Comm when needed, generally no less than once a year.
o Approval by Comm. gives stations authority to start projects in Project Outline.
o Has responsibility to work closely with administrative advisor in monitoring project performance.
o Directors, acting independently assign researchers to tasks in project as specified in approved Project Outline.

Activity	Technical Committee	Administrative Advisor	Regional Research Committee	Regional Association of Directors	Committee of Nine	CSRS Program Director
Evaluation of Project Outcomes	o Meeting as a whole, committee evaluates progress of each participant with respect to plan and recommends changes. o Individuals submit data and progress reports to all committee members before the meeting. o Chairman writes 3 page progress report annually. o Report is approved during Tech. Comm. meeting. o At termination date, decide whether Project Outline should be resubmitted, modified and then resubmitted, or terminated.	o Conference with CSRS prog. dir. on progress of component projects. o Keep informed on research progress by traveling & reading. o Negotiate with Director on needed changes. o Distribute minutes of Tech. Comm. meeting to everybody on this chart. o Submit annual report to CSRS. o Manage revision of Project Outline and resubmit to Reg.Asst. of Directors. Done by Tech. Comm.		o Directors, acting independently should keep track of progress on their portion of a regional project. o Consider request for change in commitment of resources.	o Review progress one or two years after start.	o Sit with Tech. Comm. in review session. o Read progress reports.
Implementation of results	o Publish final report and station bulletins.	o Responsible for seeing that Tech. Comm. publishes results and findings and that relevant extension specialists know of results.				

ORGANIZATION

Structural Relationships

An organization chart for the structure used in managing regional projects appears in Figure 5.

Staffing Relationships

CSRS Program Directors. With rare exception all have the Ph.D. degree or equivalent. Most come originally from the research bench in a station. A portion of the assistants are scientists on visiting appointment.

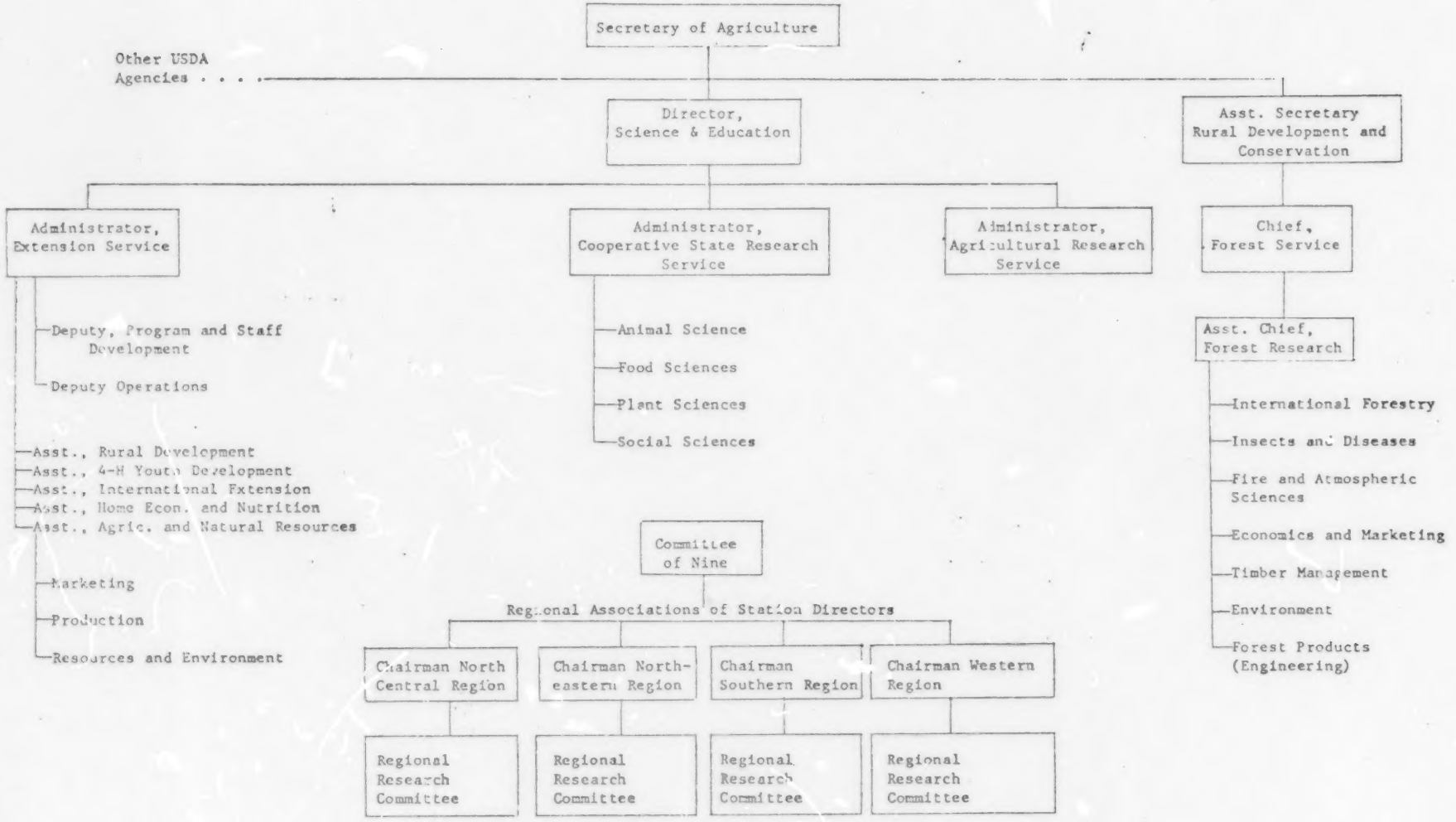
Committee of Nine. Membership is elected by and represents the Regional Associations of Directors. Each Regional Association elects two representatives to serve for three years. The ninth member is an administrator of home economics research in an SAES, elected at the annual meeting of the National Association of State Universities and Land Grant Colleges. The Committee meets tri-annually to discuss policy with CSRS and review Project Outlines.

Regional Associations of Directors. The fifty-three state experiment stations have been grouped into four regions: North Central, Northeastern, Southern, and Western. The directors of all the stations in a regional constitute a Regional Association. Each Association meets three times annually to conduct business. The Regional Association hires an executive director and other regional office staff as needed. The Association also runs the Regional Research Committee.

Regional Research Committees. The Regional Research Committee is a subcommittee of three or four of the Directors in the Regional Association of Directors.

Technical Committees. Membership includes the administrative advisor, a technical representative from each cooperating station (appointed by the station director), a CSRS program director, plus other consultants and representatives of other agencies as needed. Stations with disproportionate shares of the workload may have multiple representatives on the Committee. To the extent possible, representatives are scientists who will be involved in the project.

Figure 5: Organization Chart of CSRS and Regional Associations of Directors



Administrative Advisors. The executive direction of a regional research project is delegated to a research administrator of one of the stations in the region by the Regional Association of Directors. This administrative advisor plays two roles; his permanent job as research administrator in a station, and his temporary job as administrative advisor. In the first role, he reports to his station director. In the second role, he reports to the Regional Association of Directors. No shift in physical location is usually required in taking on the temporary assignment.

SPECIAL RESEARCH PROJECTS PARADIGM

Program Planning

Because the planning and initial development of regional research is ponderously slow, a third mechanism has been developed by CSRS to mount timely responses to sudden problems. A good example of such a problem is corn blight, which within two years came from obscurity to threaten the U.S. corn crop. CSRS's method of meeting such challenges is to mobilize the latent talent in the experiment stations through managerial action at the federal level.

When CSRS detects a problem likely to reach national proportions with a year or two's time, it goes to the Congress for a special appropriation. The special appropriation is sought when (1) time is short before the problem becomes critical, and (2) the problem affects many, but not all, states, and (3) some of the expertise needed to solve the problem resides in places other than experiment stations, for example, schools of veterinary medicine or home economics.

The means for managing these special appropriations has not converged to a uniform paradigm, so the corn blight example will be described. It embodies most of the principles CSRS feels are important in managing these special research projects. In the past, CSRS adopted a passive stance, merely announcing the availability of money and a willingness to consider proposals. Now, the importance of setting priorities and planning at the national level before money is awarded is recognized as crucial to success.

The managerial problem is to be open enough to admit all the potentially good ideas for solving the right problem, but not so open as to be inundated with proposals. In the corn blight case, the method of management was the following:

One CSRS program director was assigned full-time responsibility for the planning and development of the corn blight effort. During the first six months after the problem was first detected, this program director spent a major portion of his time studying what was known about corn blight and what the major problems seemed to be. At the same time, CSRS leadership was working to obtain the necessary special appropriation from Congress, and using the program director as a consultant on budget needs and justification.

Invitations went out to the stations and other institutions with expertise to participate in a conference on the state of research knowledge about the problem to be held two months after the planning effort began. Representatives appointed by the directors of each of the participating institutions presented papers summarizing what was known in their field and then divided into groups to discuss which problems should receive top research priorities. The state experiment stations were encouraged to continue studying the research priorities question after the conference.

Four months after the planning effort began another conference was held to focus on the question of research priorities -- what are the most important problems to solve. For the first time, each state was asked what research it would like to perform.

Simultaneously with CSRS, the intramural Agricultural Research Service was studying research priorities, too. They asked their laboratories similar questions: What are the most important problems and what contribution would your laboratory be most able to make?

Program Development

When it became apparent that Congress would appropriate funds, the program director formally asked each station and some other institutions to send CSRS two lists: the most important research tasks from a national perspective and those tasks the station was most able and willing to undertake. Both lists were to be in order of priority.

The program director reviewed these lists and the contribution each applicant had made in the planning sessions. Ability to think clearly about priorities, number of good ideas, and capability to produce quickly were the prime criteria of evaluation. The program director then invited the directors of the 15 highest ranking institutions to Washington for a final planning session.

All the priority and wish lists submitted were presented to the assembled directors in a form that enabled them to "draw lines across common areas of concern." After some discussion, the research program was reduced to the five most important kinds of research. The directors were then asked how they would allocate $1 million and $2 million to these areas should it become available.

The result of this conference was shared with ARS, and compared with their priorities. A list of the projects their labs would like to undertake if money became available was compiled. The experiment station program and regional research projects were surveyed to see what current efforts could easily be converted to the corn blight effort.

The program director, in consultation with CSRS supervisory staff, then selected nine sites to do work in the five areas. The sites were chosen using the same criteria as before: proven ability to react capably in a short time and production of many good ideas in the priorities-setting phase of planning. Each of the nine sites was requested to submit a proposal indicating what they would like to do in their assigned area.

When the money became available, each site was told to proceed with their proposed work. During the period of research performance, the program director has kept in frequent, almost weekly, contact with the performers. He has checked on progress with respect to objectives, and made sure that the results obtained by one performer are transmitted to all the others.

Program Evaluation

No mechanism for program evaluation has been established.

ORGANIZATION

Structural Relationships

Performers are drawn from existing institutions on a temporary basis so organizational relationships change with each project.

Staff Relationships

Researchers. Many of the performers on special projects are station researchers who defer work on a formula-funded or regional project, and spend at least part time on the special project. Others are not, some coming from veterinary schools, home economics schools, and non-profit research institutes.

III. NATIONAL INSTITUTE OF MENTAL HEALTH

OVERVIEW

The National Institute of Mental Health (NIMH) was authorized as an institute of NIH in 1946. The NIMH was to have an organizational structure similar to that of the other institutes, with authority to pay grants residing in an advisory council and a director reporting to the Director of NIH. But, unlike the other institutes, NIMH could operate clinics and treatment centers, run demonstrations, train practitioners, and directly aid the States in providing mental health care. The Institute's charter was broader, too. It was supposed to deal not only with the pathologies of mental illness, but also with mental health as a state of community well-being. These objectives allowed a much wider range of activities than any research agency had at that time, and are reflected in the agency's program today.

In spite of its service-oriented objectives, the new Institute was a part of NIH and, therefore, operated in a research-oriented environment. The NIMH's Congressional authorization committees were one element of this environment, and they believed strongly that basic research was the shortest cut to better treatment. Because of this research-oriented environment, the fraction of NIMH budget devoted to service-oriented activities declined in the years just after its inception.

In 1948, 80% of the $6 million budget was service-oriented (service plus training expenditures); and 10% went to research, a ratio inherited from the Public Health Service's Division of Mental Hygiene, the agency that NIMH replaced. By 1955, research had risen to 47% of a $14 million budget, while service-oriented expenditures fell to 52% of the total. The portion of service-oriented expenditures allotted to training rose substantially from 22% of the total budget in 1948 to 33% in 1955.

An effort to plan a greatly expanded and balanced program for NIMH was begun in the early 1950s at the urging of a member of the National Advisory Mental Health Council. The plan was done by NIMH's Executive Staff and called for expenditures of $50 million within 5 years.

Agreement was reached with the Council that the plan should reflect two prime objectives:

(1) reducing the severity of mental disorder through provision of treatment and prevention programs, and

(2) improving mental health by increasing basic knowledge and its utilization.

The goal of a $50 million expenditure was reached in 1959, but the allocation to treatment and prevention activities stayed small; less than $5 million or 5% of the total. Total service-oriented expenditures were not as small, however, since $20 million or 40% of the total was spent on training programs.

The Mental Retardation Facilities and Community Mental Health Center Act of 1963 marked a turning point in the balance between services and research in NIMH. This Act provided grants for constructing and staffing community mental health facilities across the country, an authority that NIMH had not previously had. Because of this act, service-oriented expenditures as a fraction of NIMH's budget rose dramatically, so that by 1970, $110 million was spent on research, $122 million on training, and $117 million on service.

In addition to increasing the emphasis on service in the agency, the Community Mental Health Center's program signaled other major changes in NIMH. An Institute with a large service-oriented component did not match well with the traditions and programs of the other institutes and suddenly the budget of this Institute was the largest in NIH. In 1966 it was decided to move NIMH out from under the Directorship of NIH to equal status in the HEW hierarchy.

Simultaneously with NIMH's move, its organization was changed to emphasize a commitment to social problems in mental health, a priority stated in its authorizing legislation. Prior to this change, NIMH was organized like most NIH institutes. The major branches were research, training, and service; and except for the service branch, those branches operated just as their counterparts in NIH did. They relied largely on unsolicited proposals for program direction, used Dual Review, and were relatively isolated from each other. The research branch supported research in the disciplines and did not seek to solve problems uncovered

by the service branch. Service-oriented problems were studied by the service branch's own research group. The training branch was largely concerned with meeting the needs for psychiatrists, psychiatric nurses, and social workers and other practitioners.

NIMH emphasized its commitment to the broader social mental health problems at the time of its move by adding a new division, the Division of Special Mental Health Programs.

The branches of this division were the Center for Alcoholism and Alcohol Abuse, the Center for Narcotics and Drug Abuse, the Center for Suicide Prevention, and the Center for Metropolitan Studies. Since the service division was already working on these problems, much of the first budget and staff of these new branches came from NIMH's service division.

These new branches differed from the old ones in two important ways. Each was authorized to support research, training, intramural research, and in some cases service. Service could include delivery of care or advice on how to deliver care. The branch could employ whatever means appeared to be the best way to solve a problem. Another difference was that each branch was assigned strong responsibility for developing a coordinated program directed to the solution of real problems. Projects were to be focused on selected problems and research, training, and sometimes intramural and service activities were to be coordinated. Two types of centers will be distinguished. Those which support research, fellowships, and training will be called *Funded Centers*, and those which support research, training, intramural research, and service will be called *Total Centers*.

While NIMH's move out from under NIH was in the planning stages, NIMH's extramural research branch realized it would soon be in an agency where the budget for services was larger than the budget for research, a strong reversal of the environment in NIH. It was able to convince enough people that the situation would be intolerable to gain independent bureau status in the HEW hierarchy at the same time that NIMH separated from NIH. However, NIMH's reorganization coincided with Secretary of HEW Gardner's efforts to centralize HEW management. As part of this effort, the NIMH recovered its former research branch and made it

the Division of Research. The research branch had been independent for only six months.

In an effort to bind NIMH's divisions more closely together and coordinate their efforts in solving priority social problems, then Director Yolles created a third type of center, which will be called a *Coordinating Center*. The first ones established were the Center for Crime and Delinquency and the Center for Child and Family Health. These centers were responsible for building a coherent program in their area by stimulating and coordinating proposals. These proposals, however, would be reviewed and funded by other branches in the Research, Training, and Service Divisions. The coordinating centers were a way of "trying out" a program to see how big the problem was, whether or not results could be obtained, and how much of a constituency would form without the necessity of institutionalizing the problem by making it a line item in the budget. At the same time, a coordinated effort to solve the problem would be going forward.

The next stage of structural change in NIMH, if current trends continue, seems to be that some of the problem-oriented centers will rise first to division-level status, and then to institute status within NIMH. The alcoholism program has already achieved institute status, which means it has an advisory council and its own budget. The coordinating centers are exhibiting a similar progression, except that they must first become Funded Centers, as Crime and Delinquency has done.

The extrapolation of this trend is to an NIMH composed of several problem-oriented institutes, each with research, training, and service capability. Under this projection the Research Division, the Training Division, and the Service Division would be gone, and the transition from an institute of NIH to a parallel agency composed of institutes would be complete.

As this brief history indicates, there is no dominant management paradigm in NIMH, but rather many paradigms. In an agency that has undergone so many changes in organization so rapidly, and that has such a broad charter, this might be expected. Discussion here will be limited to the subset of paradigms used for managing practice-oriented R&D. Paradigms for delivering services, conducting fundamental research,

training, and constructing facilities are all a part of NIMH, but will not be treated except for the ways in which they interact with practice-oriented R&D management paradigms.

Four specific paradigms will be described: *Applied Research, Coordinating Center, Funded Center,* and *Services R&D.* The first paradigm is the same method NIMH uses to manage fundamental research translated to manage problem-oriented research. Thus, in describing the management of applied research, the management of fundamental research is described as well. The Coordinating Center paradigm emphasizes linking project activity in different divisions. Many of the projects managed by the Applied Research Branch, for example, were stimulated originally by Coordinating Centers. The Funded Center is a coordinating center with its own budget. The Services R&D paradigm is a rarity among all the paradigms discussed to this point, in that many of its features are the product of research on how to manage R&D. It is employed by a branch in the Services Division that is responsible for improving the delivery of mental health services through research on better treatment and management methods.

The general features of NIMH's practice-oriented R&D activity are the following:

- o Support is given to individuals, not to institutions, to work on a problem they have proposed or been stimulated to propose by program management.
- o Support is awarded for a limited period of time, but can be renewed by competing as a new application.
- o Each proposal is submitted to a panel of the applicant's peers for evaluation.
- o Four different approaches to management are utilized simultaneously: Applied Research, Coordinating Centers, Funded Centers, and Services R&D.
- o The greatest managerial effort is applied to:
  - evaluating proposals in Applied Research and Funded Centers,
  - stimulating and coordinating research in Coordinating Centers, and
  - assessing needs for research and stimulating adoption of results in Services R&D.

SUMMARY OF NIMH PARADIGMS

APPLIED RESEARCH

General Characteristics

Primary output:	Evaluations of new models for mental health treatment, techniques or devices useful in treatment, or knowledge useful in planning better mental health services.
Mechanism of support:	Finite duration project awards are made to researchers or practitioners. These performers may be employed in a university, hospital, treatment facility, or other agency.
Managerial emphasis:	Evaluation of proposals receives the most managerial emphasis.
Staffing plan:	Program managers serve full-time in their position. Review panels are multi-disciplinary and generally include practitioners.

Program Planning

Sources of new program ideas:	Because the projects supported cover such a diversity of disciplines and problems, it is difficult to identify specific programs in the aggregate of activity supported.
Mechanisms for planning:	Except on an ad hoc basis, no planning is attempted.
Coordination:	Areas of interest are coordinated with other agencies through contact at the program director's level.

Program Development

Sources of project ideas:	Almost all project ideas are generated outside the program management process.
Means of proposal review:	Every applicant's proposal is scored by a panel of peers and then rechecked at a higher level by an advisory council.
Allocation of budget:	Grants are paid in the order determined by the panel's scores.
Monitoring of performance:	Substantive progress on projects is not closely monitored.
Evaluation of outcomes:	Records of project output are kept so that the panel can be informed of an applicant's record in completing work and its quality.

Program Evaluation

Mechanism of evaluation:	No formal procedures are used.

COORDINATING CENTERS

General Characteristics

Primary output:	Additions to fundamental knowledge about basic processes in a specific problem area, solutions to problems faced by practitioners treating this problem, and dissemination of information about this knowledge and these solutions.
Mechanism of support:	No direct financial support is given.
Managerial emphasis:	Determining research priorities and stimulating grant applications receives the most managerial effort.
Staffing plan:	The Center director is equivalent in stature to a program director and serves full-time in his position. He may be assisted by several other program managers.

Program Planning

Sources of new program ideas:	A finite list of program priorities is established by the Center director.
Mechanisms for planning:	The Center director's selection of priorities is strongly influenced by the results of structured planning conferences. Conference invitees represent a cross section of the best people in research, training, and service.
Coordination:	One of the Center's main functions is to coordinate the research, training,

and service activities sponsored by the Institute. This is done through discussions with other program directors.

Program Development

Sources of project ideas:	Workshops on methodological problems, and the Center director himself are the principal sources of new project ideas generated by the Center.
Means of proposal review:	All applications in the Center's area of responsibility are reviewed by panels in other NIMH branches. Most applications are unsolicited.
Allocation of budget:	Approved grants are intermixed with all other grants ranked by that panel and paid in rank order.
Monitoring of performance:	Grants in priority areas may be closely monitored, but most are not.
Evaluation of outcomes:	Records of project output are kept so that the panel can be informed of an applicant's record in completing work and its quality.

FUNDED CENTER

General Characteristics

Primary output:	Solutions to problems faced by practitioners delivering rehabilitation services, and assistance in training implementors of those solutions. Knowledge of underlying factors causing problem is also produced.
Mechanism of support:	Finite duration project awards are made to researchers or practitioners. These performers may be employed in a university, hospital, treatment facility, or other agency.
Managerial emphasis:	The principal managerial effort is devoted to working with the review committee to get agreement on the objectives to be followed in ranking proposals and reviewing propocals.
Staffing plan:	Program managers serve full-time in their position. Review panels are scientifically oriented, but multidisciplinary.

Program Planning

Sources of new program ideas:	Program activity is clustered around selected program objectives. New program ideas grow mostly out of successes of unsolicited projects.
Mechanisms for planning:	A set of program objectives are written by the program staff and used as a point of discussion with the review panel.

Coordination:	Areas of interest are coordinated with other agencies through contact at the program director's level. Staff members also serve on technical committees in other agencies.

Program Development

Sources of project ideas:	A good portion of the new project ideas are generated externally to the program management process; however, success on one project may suggest a sequence of research, development, and innovation activity to expand its impact.
Means of proposal review:	Every applicant's proposal is scored by a panel of peers, and then rechecked at a higher level by an advisory council. Program staff spends considerable time working with the panel on program issues.
Allocation of budget:	Grants are paid in the order determined by the panel's scores.
Monitoring of performance:	Substantive progress on proposals is not closely monitored.
Evaluation of outcomes:	Records of project output are kept so that the panel can be informed of applicant's record in completing proposed work and its quality.

Program Evaluation

Mechanisms of evaluation:	No formal procedures are used.

SERVICES R&D

General Characteristics

Primary output:	Solutions to problems faced by practitioners and administrators in delivering mental health services.
Mechanism of support:	Finite duration project awards are made mostly to practitioners or administrators. These performers may be employed in a hospital, treatment facility, or other agency.
Managerial emphasis:	An organizational change approach to problem solving is used. The primary phases of this approach are first, determination of perceived needs and potential for change; second, search for workable solutions; and third, diffusion of the results.
Staffing plan:	Program managers serve full-time in their positions. Some of this time is allotted to staff development activities.
Monitoring of performance:	At the time his application is submitted, and six months after his project begins, each grantee receives a form stating questions about results that will have to be answered at the termination date. Each grantee is site-visited every eight to nine months by his program director.
Evaluation of outcomes:	The branch staff ranks completed project on a four-point scale. The result is primarily used to evaluate the

performance of the program director in project monitoring.

Program Evaluation

Mechanism of evaluation: Each program director sets specific work objectives and a range of attainment levels. Progress against these criteria is checked.

Timing of evaluation: The program director discusses his performance with the branch chief annually. Interim progress is discussed in biweekly staff meetings.

APPLIED RESEARCH ACTIVITIES

Program Planning

The Research Division of NIMH consists of four major branches: Behavioral Sciences Research, Clinical Research, Psychopharmacology Research, and Applied Research.

The Applied Research Branch primarily supports three kinds of projects: those that evaluate new treatment models; those that develop specific devices or techniques for treatment; and those that produce knowledge useful in planning better services. Unlike projects supported in the rest of the Research Division, Applied Research's projects are supposed to produce results that will be immediately useful to a practitioner, either in making a decision or providing a service. The other branches in the Research Division support work primarily in the disciplines.

A wide range of services and problems are covered. Among the topics are problems of the aged, child disorders, such as hyperactivity, mental retardation, counseling, family structure and educational development. Proposals come from university researchers and from practitioners who want to test an idea that seems to be working. Applicants come from a wide variety of disciplinary backgrounds. The list of active projects at any one time covers so many problems, and comes from so many disciplines, and is so fractured that each program director must, in general, deal with a very heterogeneous collection of projects. The Applied Research program direction generally handles a much broader array of subjects than his counterpart managing basic research activity. Examples from the list of projects Applied Research has supported are the following:

- an evaluation of a weekend hospital built around group therapy
- development of a competence index which allows staff to know when patients are able to get along in everyday life
- research on characteristic personality patterns of chronic wanderers
- research on how individuals cope with natural disasters

- o research on the way immigrant minorities find a place to stay in a new city.

Most project proposals received by Applied Research are unsolicited, or have been stimulated by one of the Coordinating Centers, but occasionally an issue will arise that seems important to a program director. When this happens, a planning effort may be mounted. One example occurred after the first outbreaks of urban violence several years ago. A program officer became concerned over the apparent lack of knowledge about what interventions would reduce the amount of violence in riot situations. A special panel of researchers active in the field of violent behavior was convened to assess what research projects were needed. Using the panel's recommendations, the staff decided on a series of projects. The staff then stimulated a number of research proposals. The proposals were evaluated using another ad hoc panel of experts, since the regular panels were not felt to be expert enough in the subject matter of the proposals. In general, however, program planning is not a frequent activity in Applied Research.

Activity in Applied Research is divided into two program areas: Juvenile Problems and Social Problems. Each area has a review panel and a program director. Most of the time these principals engage in Program Development activities as described below.

Program Development

In Applied Research, Program Development is conducted with a method that borrows from both Single Review and Dual Review. It is like Single Review in that the program director is the one who runs the primary review panel. It is like Dual Review in that the primary panel reviews and scores every proposal and that there is a second level of review by the National Advisory Mental Health Council.

Instead of stimulating research proposals in Applied Research, the program director spends a great deal of time assisting applicants in the preparation of proposals. Because many come from applicants closer to the practitioner's world than the scientist's world, and research on real problems is not often "clean," many proposals received are

methodologically weak or poorly written. The underlying ideas are sound, but the test procedures and research design are deficient. The program directors know they can have a substantial effect on the proposal's chances of success by pointing out methodological deficiencies, styles that appeal, and background information needed. By the nature of the applicant population in Applied Research, the program director's influence on the review process is greater than in fundamental research.

The proposal review process starts in NIH's DRG where referral officers route proposals to NIMH's referral office, which routes them to one of the two panels in Applied Research. The program director of the panel to which a proposal is assigned selects a primary and secondary reviewer with an instruction to request any additional information needed to complete an adequate written review. If enough extra information is needed, the program director arranges a site visit.

The review panel meets three times annually to review about 30 to 40 proposals in a three-day session. Each proposal is discussed in turn for a half-hour and then approved or disapproved by the panel. Discussion is led by the primary and secondary reviewers. Proposals approved by a majority of the panelists are then scored by each panelist on a scale of one to five by secret ballot. The proposal's score is the average of the individual scores.

The program director then writes a summary (pink sheet) of the proposal and the panel's comments for presentation to the National Advisory Mental Health Council. The Council meets and reviews the summaries of all projects pending in all the branches of NIMH. Due to the extreme breadth of topics treated by NIMH, the Council can focus its attention only on selected grants. The rest are approved "en bloc."

The Council's attention is keyed by comments from the program directors. The program directors will point out proposals thought to have received inadequate review, those thought to be especially program relevant but low rated, or ones disapproved by more than one reviewer. The Council then notes a change in score or project budget, or refers the proposal back to the review panel for another look. The procedure is virtually the same as occurs in NIH Council meetings.

After the Council's action, each program director interdigitates the proposals ranked by his committee and then pays down the list until his budget is exhausted. The size of his budget is determined by the Applied Research Branch Chief and the Director of the Research Division. Project monitoring is conducted no differently than in Dual Review. However, in distinction from Dual Review, copies of all papers and reports written by a grantee are kept and provided to the panel with the grantee's next application. The panel considers the quality of these outputs in ranking the new proposal. A flow chart of this process appears below.

A key difference between this paradigm and Dual Review is that the program director nominates the panels. How this is done and the philosophy followed is described in the Staffing Relationship section. A diagram of the Program Development process follows in Figure 6.

ORGANIZATION

Structural Relationships

A chart of the NIMH organizations appears in Figure 7.

Staffing Relationships

Program Directors. With rare exception, all program directors have M.D. or Ph.D. degrees and usually some experience as a bench scientist. There is a small level of migration from intramural research to program management, but none in the reverse direction. Program directors are selected by the Applied Research Branch Chief and the Director of Extramural Research, and have responsibility for a single program area. Virtually none serve another role besides their assigned responsibility.

Review Panel Members. The program director serves as co-chairman of the review panel and recommends replacements for panel members from the community of scientists when their four-year term expires. These nominations are then approved up the line to the Secretary of HEW, but

Figure 6 : Program Development for Applied Research

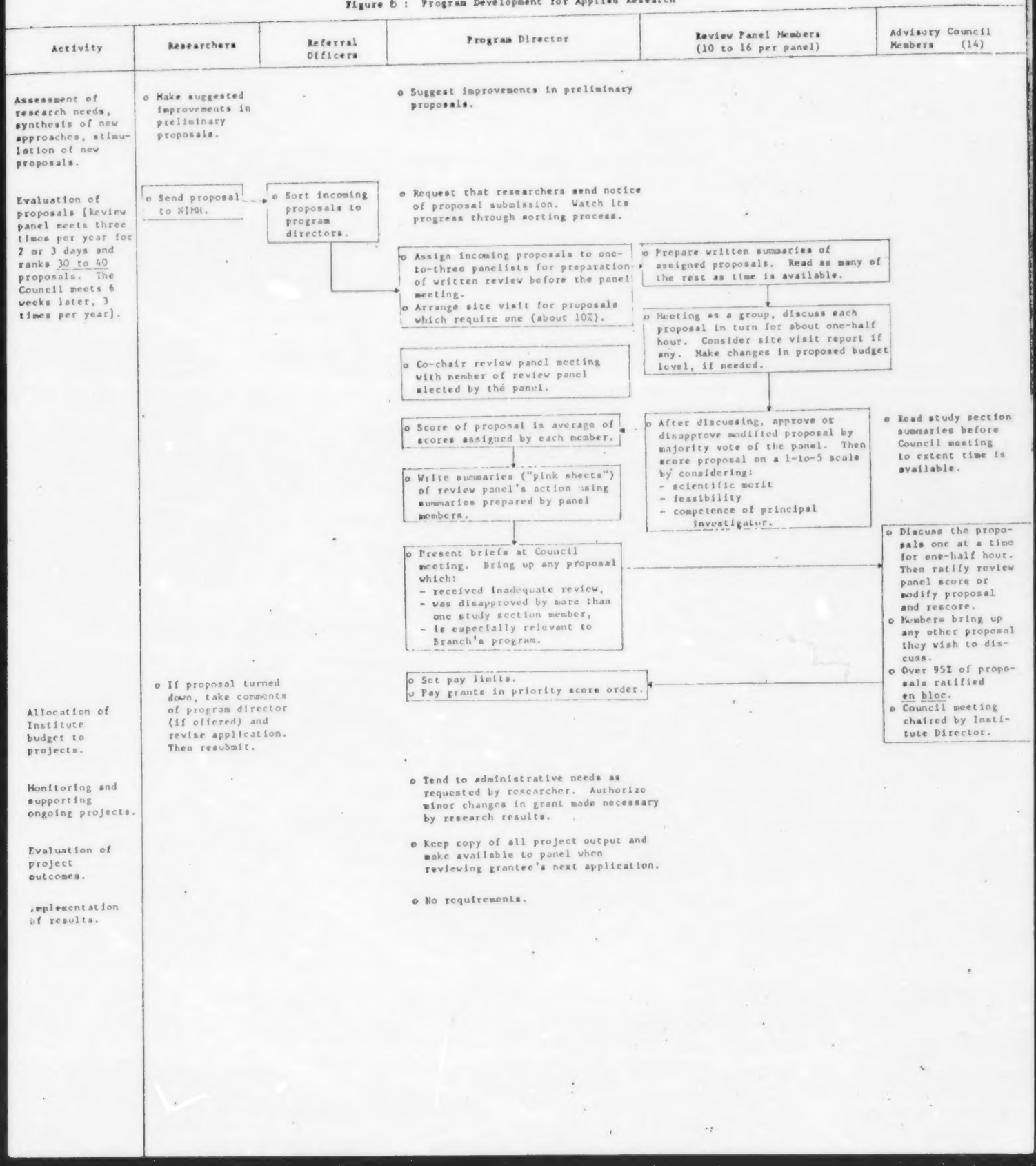
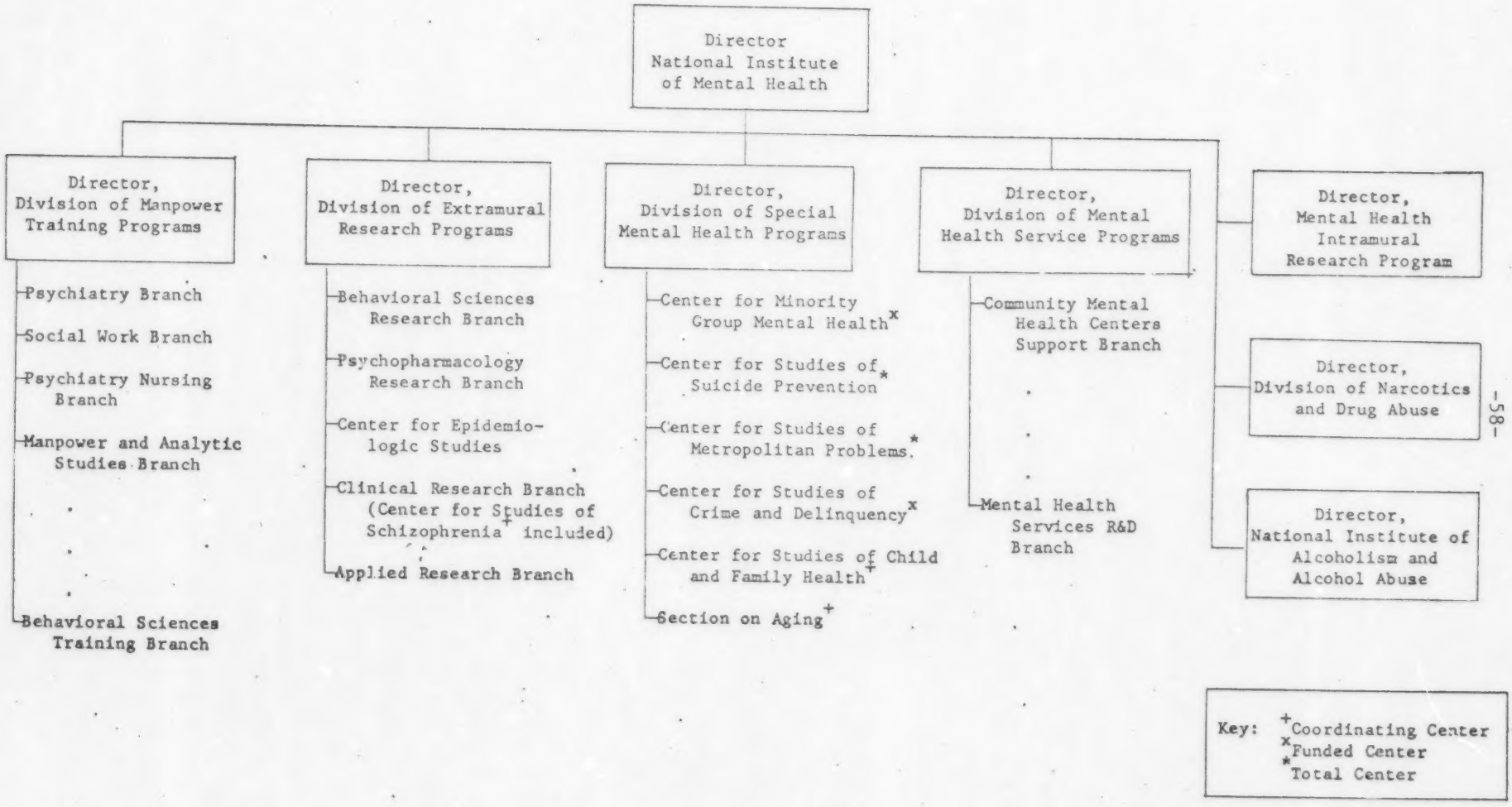

Activity
Researchers
Referral Officers
Program Director
Review Panel Members (10 to 16 per panel)
Advisory Council Members (14)
Assessment of research needs, synthesis of new approaches, stimulation of new proposals.
o Make suggested improvements in preliminary proposals.
o Suggest improvements in preliminary proposals.
Evaluation of proposals [Review panel meets three times per year for 2 or 3 days and ranks 30 to 40 proposals. The Council meets 6 weeks later, 3 times per year].
o Send proposal to NIMH.
o Sort incoming proposals to program directors.
o Request that researchers send notice of proposal submission. Watch its progress through sorting process.
o Assign incoming proposals to one-to-three panelists for preparation of written review before the panel meeting.
o Arrange site visit for proposals which require one (about 10%).
o Prepare written summaries of assigned proposals. Read as many of the rest as time is available.
o Meeting as a group, discuss each proposal in turn for about one-half hour. Consider site visit report if any. Make changes in proposed budget level, if needed.
o Co-chair review panel meeting with member of review panel elected by the panel.
o Score of proposal is average of scores assigned by each member.
o After discussing, approve or disapprove modified proposal by majority vote of the panel. Then score proposal on a 1-to-5 scale by considering:
- scientific merit
- feasibility
- competence of principal investigator.
o Read study section summaries before Council meeting to extent time is available.
o Write summaries ("pink sheets") of review panel's action using summaries prepared by panel members.
o Present briefs at Council meeting. Bring up any proposal which:
- received inadequate review,
- was disapproved by more than one study section member,
- is especially relevant to Branch's program.
o Discuss the proposals one at a time for one-half hour. Then ratify review panel score or modify proposal and rescore.
o Members bring up any other proposal they wish to discuss.
o Over 95% of proposals ratified en bloc.
o Council meeting chaired by Institute Director.
o If proposal turned down, take comments of program director (if offered) and revise application. Then resubmit.
o Set pay limits.
o Pay grants in priority score order.
Allocation of Institute budget to projects.
Monitoring and supporting ongoing projects.
o Tend to administrative needs as requested by researcher. Authorize minor changes in grant made necessary by research results.
Evaluation of project outcomes.
o Keep copy of all project output and make available to panel when reviewing grantee's next application.
Implementation of results.
o No requirements.

Figure 7: Organization Chart of NIMH



seldom denied. The review panel co-chairman is chosen by the program director.

Since the range of disciplines and problems covered by each panel is large, nominating panel members is a difficult job for the program director. In general, the best policy is to select two or three panelists from each discipline frequently relevant to the program, and at least two or more practitioners. It is especially important to have two or more extremely strong methodologists on the panel.

National Advisory Mental Health Council Members. At least six are required by law to be authorities in mental health or science fields important to the Institute's concern. Two are *ex officio* representatives, one required from DoD and the other from the Veterans' Administration -- and as selected, they tend to be scientists. Of the remaining six positions, one or two are usually lay representatives and the rest scientific. Advisory Council members are nominated by the Institute Director and approved up the line to the Secretary of HEW.

COORDINATING CENTER ACTIVITIES

Program Planning

Coordinating Centers are a distinctive form of organizational unit that NIMH has devised for coordinating R&D projects in a particular problem area that are being performed in its separate divisions.

Over the last few years, Coordinating Centers have been organized around a variety of problems and in a variety of ways. The section on the aged, which is not formally designated as a Coordinating Center, is a group of program managers in the Special Mental Health Programs Division. The Center on Child and Family Mental Health is designated as a Coordinating Center in the Special Mental Health Programs Division and consists of seven people. The Center on Schizophrenia is a part of the Clinical Research Branch of the Extramural Research Division and is run by two people, a Director and his assistant. While still a Coordinating Center in the Special Mental Health Programs Division, the Center on Crime and Delinquency was run by two people, the Center Director and his assistant. The Crime Center has now graduated to Funded Center status in the Special Mental Health Program Division.

Even though each Coordinating Center runs a little differently and has different relationships with other NIMH divisions, some characteristics are uniform.

- All Coordinating Centers keep track of projects in all three functional divisions; Research, Training, and Service.
- None of the Coordinating Centers run proposal review committees. Grants stimulated by a Center are reviewed by the permanent panels run by other branches.
- The research areas being dealt with are vaguely defined, and not yet very effective in solving practical problems.
- A substantial amount of research, training, and service grant activity related to the problem was present when the Center was formed (e.g., 30% of the extramural research budget was for schizophrenia.

Some differences among the centers are that:

- o Some centers deal with a problem that is generally accepted to be a mental health problem (e.g., schizophrenia) while other centers deal with a problem on which other agencies are also doing research.
- o Some centers deal with a comparatively narrowly defined problem (e.g, schizophrenia), while other centers have a domain that covers a tremendous range of problems.
- o And, as already mentioned, some centers are in functional Divisions, while some are in the Special Mental Health Programs Division.

The level of frustration among the leadership of these centers over their ability to influence project activity varies. It correlates with the factors listed above. Correlation, however, does not prove causation. The Director of the Schizophrenia Center, which deals with a more narrowly defined, primarily mental problem, expresses less frustration with his position than the other center directors. The managers interviewed in other Coordinating Centers expressed a great deal more frustration over their asserted inability to affect R&D activity. In each case, these centers deal with a broadly defined problem that is not necessarily a mental health problem. Most of the frustration stems from territorial issues inherent in the center's lack of a budget.

Centers have been started for a variety of reasons in addition to the desire to coordinate R&D activity. One reason is the presence of other centers. When a center is started, it gives visibility to a problem area within an agency. Strong constituencies, which have little interest in being left out, bring pressure to form a center for their problem. Another factor that is associated with the establishment of centers is the creation of an interagency or presidential level commission on a problem in which NIMH is interested. As in the case of community mental health centers, large programs sometimes result from these commissions. The Coordinating Center is a way for NIMH to indicate active interest in a problem without becoming committed to a line item in the budget.

Coordinating Centers may be a very appropriate mechanism when only rudimentary knowledge about a problem is available. By establishing a Coordinating Center instead of a permanent unit with its own budget, there is reduced chance that one clientele group or one perspective will dominate in solving the problem. Since it cannot fund projects directly, the Center must work cooperatively with other Centers. And, to be effective in its role, the Center must work with more than one branch, or be charged with territorial infringement. In being forced to work cooperatively with several other branches, the Coordinating Center is naturally kept open to new ideas and opportunities. The Center for Studies of Schizophrenia is a good example. Even though schizophrenia has been studied from some time, it is still poorly understood. A variety of therapeutic methods, including drugs and behavioral approaches, have been tried, to some success, but the underlying mechanisms of the disorder, and a cure, have not been found. After years of trying to cure schizophrenia with drugs, there is evidence that at least some kinds of schizophrenia might be a social problem. No lesions have been observed and apparently it is not a disease. Under these circumstances, it is advantageous from a managerial point of view to avoid tying an R&D program to one research discipline or treatment approach. Establishing a separately funded activity for schizophrenia would have run the risk of overspecifying the problem too soon.

Since the several Coordinating Centers operate in different ways to a greater extent than with other management approaches, there is no common management paradigm. As an alternative, the operation of one of these Coordinating Centers will be described.

The director of this Center has a solid reputation as a researcher in the problem area with which his Center is concerned. The director feels that this makes an important difference in his success in dealing with program directors and panels in other branches. Program directors see him as a scientist committed to solving a problem, who could just as well be at the research bench, and not as an administrator encroaching on their territory. In addition, the program director can approach the review panelists as an equal, which greatly improves his impact.

The Center deals with program directors in all three divisions of NIMH and, for the most part, three review committees in those divisions. Two of these review committees are in Research and one is in Training. The Service Division is used primarily as a source of projects or opportunities, which can be made to yield research results if a proper research design is added. There is little attempt to promote specific service projects. The Center director keeps track of whatis going on in the Training and Service Divisions by reading summaries of review panel actions (pink sheets) and talking with program directors.

One characteristic problem that gets the director's attention is the tendency in training and service to apply uniform treatments without regard for categories of problems. For example, training in psychiatric residency programs is treatment-oriented, not disease-oriented. Thus, trainees do not specialize in diseases, but in treatments. The Center director works with program directors in the Training Division by explaining what research has discovered about the disorder with which he is concerned and encourages them to get improvements incorporated in new training grants.

Besides his own knowledge, the Center director has used structured conferences as an aid in developing program priorities and ideas. For one of these conferences, about 100 professionals from research, training, and service were invited to assess the state of knowledge about the Center's problem; assess how well this knowledge was being applied in training and service; and recommend research, training, and service priorities. Experts in each of these functional areas were asked to prepare state-of-the-art papers. In research, eight were prepared, one each in topics such as genetics, bio-chemistry. perception, and epidemiology. In service, consultants were hired to do a partial survey of facilities. In training, practitioners were hired to summarize the current state of affairs.

After an opening plenary session, the conference was broken into eight working groups; four in research, and two each in training and service. Each group was assigned a portion of the papers in its functional area, and given the task of reviewing these papers and writing a group position paper. The next morning, these papers were presented

at a second plenary session. After this session, the conference was broken down into small groups again, except that this time each one contained a balance of research, training, and service people. Each group was assigned two or three common questions, plus a special question. Two of the common questions were: What are the barriers to utilization of research findings? and What research possibilities have the most promise? One special question was: What should be required in psychiatric training for disorder, where X was specified? The lists of priorities showed a lot of overlap, including some motherhood recommendations, but some surprising ones, too. One and a half years after this conference, a conference of the group chairmen will be held to assess what progress the Center had made since the first meeting, and to replan the Center's priorities, if necessary.

At the present time, the Center director has three priorities under development.

Program Development

The Center director has four means of stimulating research activity in his priority areas. One of the most successful means are small workshops, where methodological issues pertaining to one of the priority areas are discussed. Personal visits and seminars delivered at universities and elsewhere are a second means. The journal that the Center publishes is a third means.

In each volume of this journal, the Center director writes an editorial highlighting particular issues and what research he thinks is most important. The editorial is written in such a way that readers will infer what proposals would be most warmly received by the Center.

A fourth means is by direct collaboration with another researcher. This technique is used when the level of research being conducted in a priority area is low. Sometimes the cause of low quality research is a general pessimism in the research community engendered by years of consistently fruitless effort. If the Center director thinks he knows a better way to do research in one of these areas, he finds an extramural collaborator who writes a grant proposal himself and submits this

application through normal channels with the collaborator's and his own name on it. Usually, the collaborator is a practitioner who has the needed sample of patients or other data. If the research is successful, it becomes a model for doing research in the priority area.

The Center is not authorized to evaluate proposals, so all of them are sent to review panels run in other branches. The mechanics of this review process are exactly the same as for Applied Research, which were described in the previous section and Figure 6; therefore, they will not be described in detail here. The Center's proposals compete against all other proposals ranked by the branch, and are interdigited with them in determining the order of payment.

The Center director spends a fair amount of time working with the review panels and program directors that handle his proposals. It has been the Center director's experience that at least two or three of the panelists must be recognized contributors in the center's field, or the Center's proposals will fare poorly in the evaluation process. Since panelists are appointed through a continual bargaining process between the program director, his panel, and the Division Director, the Center director must get involved, or not expect many representatives from the Center's field on the panel.

The Center director is much more successful in this effort if he works with the panel on substantive issues. One way is to discuss his research program with the panel at the beginning of their review session. His competence as a scientist helps greatly in getting the panel's interest in this discussion. Another method used is to bring problems before the panel to get their advice.

One problem brought to the panel was a situation where several researchers working in one of the Center's priority areas were working independently and using separate data bases. A workshop on the matter failed to stimulate the desirable collaborative effort, partly because none were willing to pay the extra costs involved. The panel discussed the problem with the Center director. They suggested that he find somebody who would be willing to submit a grant that proposed funds for a new experiment, which they specified, and for the researchers to

exchange lab visits and data. The panel said they would like to review the application. It was reviewed, received a high rating, and was paid. Some panel members are now participating in site visits of the ongoing grant.

The Center also fulfills an information dissemination role through publication of the journal mentioned previously. Each issue of the journal contains review articles and original papers on a selected theme along with brief summaries of negative research findings, NIMH program descriptions, announcements, and lists of recent books. The journal is sent to researchers, clinicians, teachers, and laymen and has a format directed to the practitioner. The journal serves as a vital link between research, training, and service activities in the Center's field.

ORGANIZATION

Structural Relationships

An organization chart showing some of the Coordinating Centers explicitly appears in Figure 7. Others are found in the Research and the Service Divisions.

FUNDED CENTER ACTIVITIES

Program Planning

Organizationally, the Funded Center is indistinguishable from the Applied Research Branch, for the staff consists of a program director, plus assistants, and a multidisciplinary, scientific review panel. Many of the procedures followed, especially in proposal review, are virtually the same. Functionally, however, the Funded Center's responsibility is different from that of the Applied Research Branch. The Director of the Division of Special Mental Health Programs, to whom the Centers report, has charged each Funded Center with mounting a coordinated, directed attack on problems in its area of concern. Applied Research does not have a similar mandate.

The Center's ability to mount a coordinated, directed attack on problems is aided by its authority to fund both research and training grants. This allows the Center to take advantage of solutions or knowledge when they come along and to assist their introduction into practice. For example, if a research project determines that a certain way of using citizen volunteers as probation agents for misdemeanor offenders is effective, and an evaluation project is done to verify the discovery, then a curriculum for training the volunteers needs to be developed, and instructors for the curriculum need to be trained. Furthermore, a research project might be indicated to determine whether the same approach, or one using ex-offenders would work with criminal offenders. The ability to choose just the funding instruments needed to do a certain job is crucial to the Center's ability to program R&D projects.

While the Funded Center can choose between a research instrument and a training instrument in solving a particular problem, it does not have much control over the aggregate balance between research and training. This balance is determined by the NIMH Director's office. Because research and training are line items in the NIMH budget, the Director's office must constrain the Funded Center to separate accounts for research and training, or have trouble meeting its line item commitments.

A Funded Center's budget is typically not very large in relation to the dimensions of its problem area, so the goal of mounting coherent, directed programs makes it necessary to define objectives and concentrate resources on them. As an example, the Center for Crime and Delinquency spent $3.5 million on research grants and $2.1 million on training grants in 1970.

Another reason the Funded Center sets program objectives is to build accountability into the program management process. Without objectives, it is impossible to measure success, and more difficult to get the several people involved in the Center working toward the same ends.

Determining program objectives has consumed 5 to 10% of the program staff's time over the years; however, no regular process is followed. For the most part, the Center's objectives have been written by the program staff. Interactions with the review panel, knowledge gaps that have become apparent over the years, and project successes all have their effect on successive versions of the objectives.

Program objectives and project activity are coordinated with other agencies working in the same area by periodic meetings between the program directors involved. Sometimes these meetings result in referral of applications from one agency to another. Also, Center staff members serve on committees in other agencies.

The Center's objectives guide program development in two ways. They guide the program staff's thinking in stimulating research proposals from investigators, and they provide a framework for discussing project priorities with the review panel.

Program Development

It is important that priorities be discussed with the review panel because their judgments essentially determine the list of projects that the Center supports. If the panel's priorities are not the same as the Center's, then the Center will have a different set of objectives than planned. Center management gets agreement on priorities between the Center and the panel by spending a good deal of time discussing priorities and objectives with the review panel. The first day of each three-day review session is set aside for discussion of program objectives,

the significance of project outcomes, training issues, the funding situation, or any other issue that becomes important.

These policy sessions are conducted informally with free-wheeling discussion among the panel members. The program director, who chairs the meeting with an elected member of the panel, modulates the course of discussion by interjecting comments at selected points. He attempts to keep discussion on the track and steers away from situations where one panelist dominates the discussion. To raise the quality of discussion, the program staff usually prepares an issue paper on the items of discussion that sketches the current state of affairs and outlines alternatives.

The effect of these discussions on the Program Development process is indirect, for votes on issues or resolutions are rarely taken. The attempt is to work for a consensus among the panelists and then rely on consistent application of the policy agreement whenever it needs to be applied. As an example of how this works, one Center discussed the utility of funding more verbal conditioning experiments. Verbal conditioning experiments are generally tight and neat scientifically, and therefore attractive to some scientists, but very difficult to translate into effective treatments. After spending some time discussing this issue, the panel gave proposals to do verbal conditioning experiments a low rating, even though such experiments are thought by some to be "good science."

The rest of the Program Development process is similar to the Applied Research paradigm except for some minor variations. After spending the first day on policy, projects are brought up for review. Each proposal is discussed in turn. Discussion is begun by the panelists assigned as primary and secondary reviewers. After their presentation, the program staff comments on the proposal, indicating the previous record of the applicant, whether or not he submitted final reports, substantive comments on the proposal, and the ability of the applicant to administer his grant. Program staff takes care not to give the appearance that it is advocating a proposal, otherwise the panel will be likely to give it a low rating. In the evaluation session, the program staff makes it clear that the panel is responsible for making the

proposal evaluation decisions on the basis of scientific quality.

One difference between the Center's panel and Applied Research's panel is that only 15 to 20 applications are graded in the two days per session allotted to evaluation. This makes it more feasible for all panelists to read all proposals before the meeting. In addition, the panel grades clearly superior applications after only ten minutes, or less, of discussion.

As in Applied Research, each proposal is ranked by the panelists on a scale of one to five using a secret ballot. The proposal's score is the average of the individual scores.

After being ranked by the panel, each proposal is reviewed again by the National Advisory Mental Health Council in exactly the same way as in Applied Research. The Center then pays grants in order of their score until the budget is exhausted. No grouping of projects by objectives is attempted in setting pay limits.

Grantees are somewhat more closely monitored than in Applied Research. After the first year, each one is asked to state how his research will be useful in solving one of the Center's problems. The grantee also submits an annual progress report and may get a call from the program director at any time. During performance, small changes in the grant budget are approved by the program director, but significant ones are brought to the review panel. One year before the termination date of a grant, the program director gives the granteee his views on items that should be in the grantee's final report.

The only other difference between Applied Research and the Funded Center is that the Center's program staff spends some, though not a major part, of its time stimulating research proposals. Stimulation is often necessary to move a successful idea from one stage of implementation to the next, or to investigate a particularly interesting possibility. This is primarily done by telephone contact, but scientific conferences and side trips are used, too. In a short time, the program director builds up a substantial list of people interested in working on his problem. The review panel and former panelists are also strong linkages to potential performers.

A diagram of the Program Development process appears in Figure 8.

Figure 8: Program Development for Funded Center

Activity
Researchers
Referral Officers
Program Director
Review Panel Members (10 to 16 per panel)
Advisory Council Members (14)
Assessment of research needs, synthesis of new approaches, stimulation of new proposals.
o Make suggested improvements in preliminary proposals.
o Contact potential grantees to see if they will do needed work.
o Suggest changes in preliminary proposals.
o Request that researchers send notice of proposal submission. Watch its progress through sorting process.
Evaluation of proposals [Study section meets 3 times per year for 2 or 3 days and ranks 15 to 20 proposals. The Council meets 6 weeks later, 3 times per year.]
o Send proposal to NIMH.
o Sort incoming proposals to program directors.
o Assign incoming proposals to one to three panelists for preparation of written review before the panel meeting.
o Arrange site visit for proposals which require one (about 10%).
o Prepare written summaries of assigned proposals. Read as many of the rest as time is available.
o Discuss program issues with panel for first day of each review session.
o Discuss objectives, relevance of particular kinds of research, and administrative policies with program staff on first day of review session.
o Co-chair review panel meeting with member of study section.
o During review interject comments about previous record of applicant, substantive points.
o Meeting as a group, discuss each proposal in turn for whatever time is needed. Make changes in proposed budget level, if needed.
o Score of proposal is average of scores assigned by each member.
o After discussing, approve or disapprove modified proposal by majority vote of the panel. Then score proposal on a 1 to 5 scale by considering:
- scientific merit
- feasibility
- competence of principal investigator.
o Write summaries ("pink sheets") of review panel's action using summaries written by panelists.
o Present briefs at Council meeting. Bring up any proposal which:
- received inadequate review
- was disapproved by more than one study section member
- is especially relevant to Branch's program. (less than 1% of total)
o Read study section summaries before Council meeting to extent time is available.
o If proposal turned down, take comments of program director (if offered) and revise application. Then resubmit.
o Discuss the proposals one at a time for one-half hour. Then ratify review panel score or modify proposal and rescore.
o Members bring up any other proposal they wish to discuss
o Over 95% of proposals ratified en bloc.
o Council meeting chaired by Institute Director.
Allocation of Institute budget to projects.
o Set pay limits.
o Pay grants in priority score order.
Monitoring and supporting ongoing projects.
o Authorize minor changes in grant made necessary by research results.
o After first year of project, grantee asked to state how his research will be useful in solving one of the Center's problems.
o One year before the end of the grant give grantee views on what should be in his final report.
Evaluation of project outcomes.
o Keep a copy of the grantee's final report and a brief evaluation by staff in the Center's files.
Implementation of results.
o No requirements

ORGANIZATION

Structural Relationships

The Center is not large enough to warrant an internal structure. Its place in the NIMH hierarchy is indicated in the organization chart in the Applied Research paradigm.

Staffing Relationships

Program Directors and Assistants. With rare exception, all have the M.D. or Ph.D. degree and usually some experience as a bench scientist. There is a small level of migration from intramural research to program management, but none in the reverse direction. Program Directors are selected by the Special Mental Health Programs Division Director. Virtually none serve another role besides their assigned responsibility.

Review Panel Members. The program director recommends replacements for panel members from the community of scientists when their four-year term expires. These nominations are then approved up the line to the Secretary of HEW, but seldom denied. The review panel co-chairman is chosen by the program director.

Since the range of disciplines and problems covered by each panel is large, nominating panel members is a difficult job for the program director. In general, the best policy is to select two or three panelists from each discipline frequently relevant to the program. It is especially important to have two or more extremely strong methodologists on the panel.

National Advisory Mental Health Council Members. At least six are required by law to be authorities in mental health or science fields important to the Institute's concern. Two are *ex officio* representatives, one required from DoD and the other from the Veterans' Administration -- and as selected they tend to be scientists. Of the remaining six positions, one or two are usually lay representatives and the rest scientific. Advisory Council members are nominated by the Institute Director and approved up the line to the Secretary of HEW.

SERVICES R&D ACTIVITIES

Program Planning

Over the last five years, the managers currently running the Mental Health Services Development Branch of the Division of Mental Health Services have evolved a strategy and a set of tactics for conducting R&D on methods of delivering mental health services by successively altering the Applied Research paradigm. The first stage was stimulated by an evaluation that showed that it was possible to obtain a written statement of findings from only 40% of completed projects. The correction applied was careful *monitoring of grantee performance*. A subsequent evaluation revealed that availability of a final report did not very often ensure utilization of its results. Less than 20% of the principal investigators could name one place using their results. The correction added this time was an inducement that encouraged each grantee to *disseminate* his final product with written publications. Studies of mental health innovations then showed that written materials initiate less than 9% of the adoptions in mental health service delivery. The third evolution stage was a program of special devices to *stimulate utilization of results*. The difficulty that arose this time was that not enough of the projects results solved problems that practitioners frequently had.

The fourth stage of development now being instituted emphasizes an *organizational change* approach to R&D management. All the mechanics developed earlier are retained, but the role of the program staff is drastically changed from one of managing a grant program and then stimulating adoption of results to finding out what problems practitioners have, and then getting the technical assistance they need to solve their problems. In working with practitioners, the program staff uses what has been discovered in research on organizational change. Some of the more relevant findings used are that the probability of achieving a change is related to:

- the availability and amount of resources needed to make the change

- o the congruence between the adopter's values and those implicit in the innovation,
- o the compatibility with available information of information required as input by the innovation,
- o the degree of dissatisfaction with conditions on the part of the potential adopter,
- o the political conditions, such as crises that prevail at the time of adoption,
- o the resistance mounted by external parties, and
- o the potential yield of the innovation..

As an example of how these findings are used, the branch encourages practitioners to conduct evaluations of mental health services. The effect of these evaluations is often enough to heighten dissatisfaction with existing conditions and, therefore, to raise the demand for innovations. To aid this process, the branch has a priority R&D on improved methodologies for conducting evaluations.

Another branch priority is staff development. Biweekly staff development meetings are held to exchange managerial, organizational, and sometimes interpersonal problems, and learn management skills. Courses and manuals for learning organizational change techniques have been developed. A publication called the *Journal of Innovations and Current Conclusions* is produced with staff members assigned responsibility for input in their respective specialities. This works to maintain the program director's substantive expertise.

Branch activity is loosely organized. Each program director on the staff has responsibility for one of 16 program areas. These program areas are overlapped to encourage exchange of resources, and interactive discussion between the program directors. The program areas are clustered into sub-groups composed of similar problem areas with each program director serving as sub-group coordinator on a rotating basis. The coordinator convenes the sub-group for mutual planning efforts, coordinates mutual planning efforts, and handles administrative chores.

One management experiment underway at the present time is to assign one program director in a sub-group responsibility for assessing "emerging needs" and translating them into research project ideas to be

considered and developed by the rest of the sub-group. This program director spends essentially all of his time in a program planning mode.

Branch priorities are set by the branch leadership and revised when conditions warrant. Because of the way program area responsibilities are assigned, priorities sometimes cut across branch sub-groups, allowing contributions to a priority by more than one sub-group. As an example, program priorities at one time were:

(1) Children's mental health services.

(2) Sheltered services for the mentally ill.

(3) Evaluation and innovation in mental health.

(4) Allied systems of services delivery.

These can be compared to program area responsibilities listed in the Structural Relationships section of this paradigm.

In setting priorities, the branch leadership relies on several sources. First, whenever program staff attend a meeting or conference they circulate a small survey form that has been designed. Many of these are practitioners' and administrators' meetings. One result has been the discovery that perceptions of critical areas in mental health vary greatly among categories of respondents. Researchers often have different perceptions of problems than practitioners and administrators. A second method is formal program evaluations, contracted especially to assess impacts and availability of community mental health services. A third source is now in the design stage. It will be a system for collecting biometric data on populations in mental health facilities across the country. All of these methods are adjuncts to the usual political and social pressures.

Program activities are coordinated with similar work in other places through the usual means: participation on task forces and informal contacts.

Program Development

Each program director is responsible for coordinating project activity in his program area along several dimensions. One responsibility is to have the projects active in his area reflect branch priorities and be

derived from specific needs felt by practitioners. In addition, there should be sufficient diffusion and utilization mechanisms built into each project. The program director is responsible for stimulating auxiliary diffusion and utilization mechanisms if a project turns out to require them. The program director is also responsible for developing collaborative projects on different aspects of a problem, when this is desirable.

The program director can meet this responsibility because the branch's project workload is light compared to other paradigms. Each program director has about four new grants each year, and approximately seven active at any one time.

Despite his responsibilities for coordinating grants, the program director cannot award, or even promise, grants to individuals. The program director is limited to stimulating grants he needs because all proposals must be evaluated by the branch's review panel.

He does this by finding qualified potential performers, and consulting with them in preparing a proposal. The principal means of finding potential performers is by working through practitioners and researchers dealt with over the years, or recommended by other program directors. Not all the proposals funded by the branch are stimulated, however. Many applications are received from practitioners and others who feel they have good solutions to a problem.

Before investing effort in stimulating a proposal, the program director is responsible for searching the literature and his contacts to see if a solution already exists. A search of NIMH projects is performed first using NIMH's computer information system. If another NIMH branch has already found a solution, the program director's next job is to get the solution adopted, not to stimulate a research project. A literature-screening service is also used, but in Services R&D, solutions are not always in the open literature. This happens because many projects are performed by practitioners or administrators who have neither the time nor the incentive to publish in journals. Articles are solicited from these people for the staff's *Journal of Innovations and Current Conclusions*, but this does not go far toward solving the problem.

Proposals are evaluated in essentially the same way as with Funded Centers and re-reviewed by the National Advisory Mental Health Council. The primary review panel meets four times a year for two or three days each time. One of the sessions is allotted to discussion of program issues, and at the rest, part of the time is reserved for discussion of program priorities. At the program issues session, program directors brief the panelists on needs in their area.

In the future, as the panel's workload grows, an additional panel will be formed. One will handle research grants and the other development grants.

Once a project is funded, the grantee's performance is monitored by the program director. He visits the grantee every eight or nine months to discuss progress. At every contact the program director asks the grantee what he expects his final results will be, and how they will be diffused or disseminated. The program director offers guidance in preparing a diffusion plan and the final report. The program director knows that the question of how results will be disseminated is important, for research supported by the branch has shown that investigators who plan for diffusion of results from the beginning of their project are much more likely to have their results used in practice. For this same reason, the branch includes a questionnaire with each application mailed to a prospective grantee. The questionnaire has the same questions on it which the grantee will be asked to answer when his project is finished. Some of the questions are: What information did the project yield that would be of value to others? By what method were results obtained? What dissemination efforts were completed? Who is using the results? The same questionnaire is sent after six months of a project have elapsed to remind the grantee that he will be held accountable for dissemination at the end of his project. At the end of his project, the grantee is asked to fill out the questionnaire. By this technique, the percentage of projects submitting final reports has increased from 40% to 95%, and the number of projects reporting adoption of results by others has risen from 19% to 50%.

The program directors are in a position to counsel grantees on the best ways to diffuse project results, since over the years, research on

this subject has been done by the branch. A set of proven models is available for use in specific situations. The branch can also facilitate adoption directly because it has budget to fund demonstrations, training activities, and some other utilization aids in addition to research and development.

A description of the program development process appears in Figure 9.

Program Evaluation

Instead of evaluating its programs directly, the branch evaluates each program director's performance using a "Goal Attainment Scale" method. At the beginning of each year, the program director, in consultation with the branch chief and the branch staff, decides on a set (usually about five) of specific work objectives for the ensuing year. For each objective, five levels of achievement, in terms of specific outcomes, are written down. The levels are assigned integer values from -2 to +2 for the highest to lowest levels of attainment. Each objective is then assigned a weight from 0 to 10. At any point in time, program director's "attainment score" is simply the product of each objective's weight factor times its level of attainment, summed over all objectives.

The program directors and the branch leadership revise these rating grids quarterly, but progress is evaluated by the branch chief once a year. Progress toward each program director's objectives is one of the items discussed at the biweekly staff meeting. By discussing progress in joint session, self-deluding estimates are avoided.

ORGANIZATION

Structural Relationships

An organization chart for NIMH appeared in Figure 7, and shows the position of Mental Health Services R&D branch in NIMH. A diagram of the inside organization of this branch appears in Figure 10.

Figure 4: Program Development for Services R&D

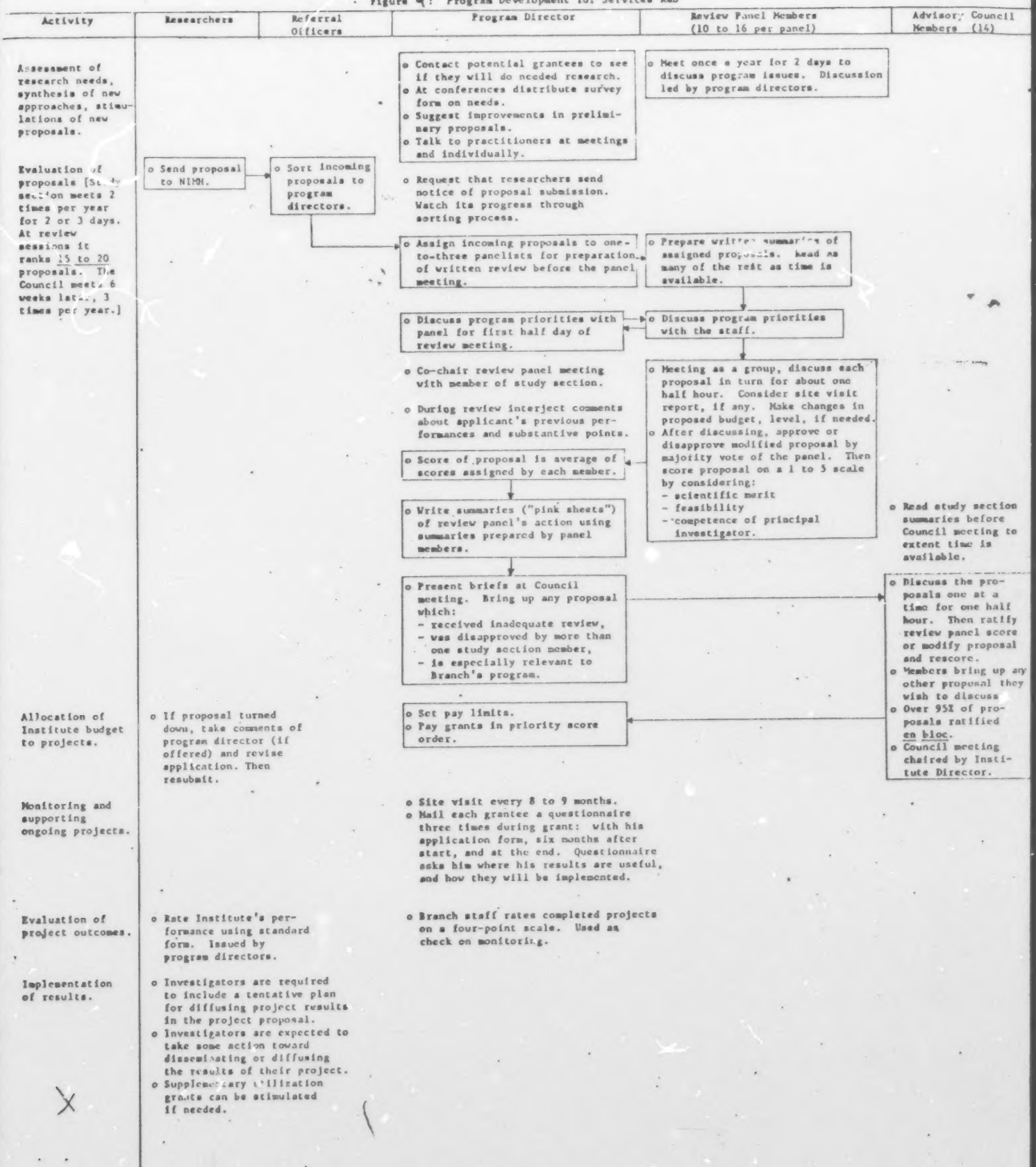
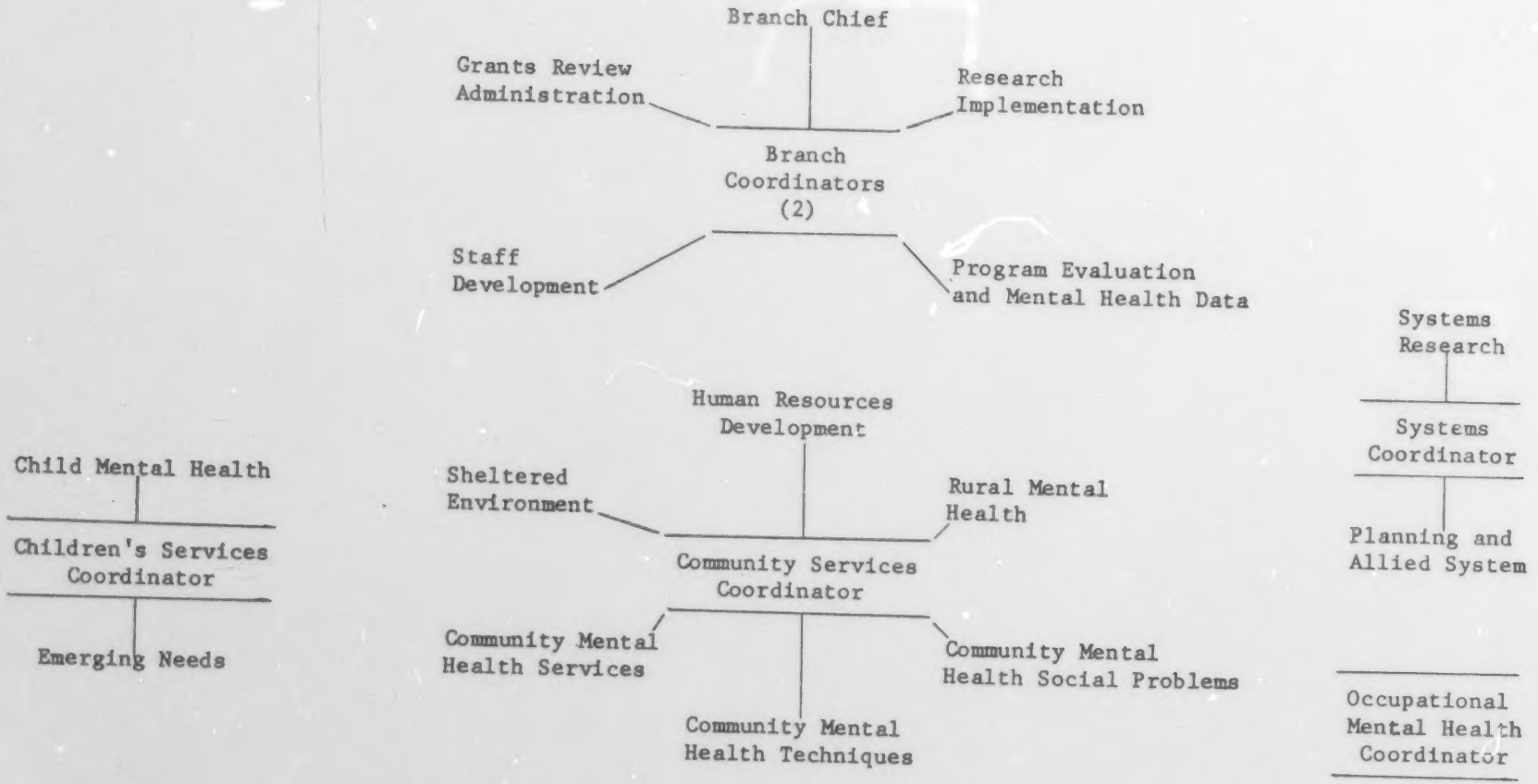

Activity
Researchers
Referral Officers
Program Director
Review Panel Members (10 to 16 per panel)
Advisory Council Members (14)
Assessment of research needs, synthesis of new approaches, stimulations of new proposals.
o Contact potential grantees to see if they will do needed research.
o At conferences distribute survey form on needs.
o Suggest improvements in preliminary proposals.
o Talk to practitioners at meetings and individually.
o Meet once a year for 2 days to discuss program issues. Discussion led by program directors.
Evaluation of proposals [Study section meets 2 times per year for 2 or 3 days. At review sessions it ranks 15 to 20 proposals. The Council meets 6 weeks later, 3 times per year.]
o Send proposal to NIMH.
o Sort incoming proposals to program directors.
o Request that researchers send notice of proposal submission. Watch its progress through sorting process.
o Assign incoming proposals to one-to-three panelists for preparation of written review before the panel meeting.
o Prepare written summaries of assigned proposals. Read as many of the rest as time is available.
o Discuss program priorities with panel for first half day of review meeting.
o Discuss program priorities with the staff.
o Co-chair review panel meeting with member of study section.
o During review interject comments about applicant's previous performances and substantive points.
o Meeting as a group, discuss each proposal in turn for about one half hour. Consider site visit report, if any. Make changes in proposed budget, level, if needed.
o After discussing, approve or disapprove modified proposal by majority vote of the panel. Then score proposal on a 1 to 5 scale by considering:
- scientific merit
- feasibility
- competence of principal investigator.
o Score of proposal is average of scores assigned by each member.
o Write summaries ("pink sheets") of review panel's action using summaries prepared by panel members.
o Read study section summaries before Council meeting to extent time is available.
o Present briefs at Council meeting. Bring up any proposal which:
- received inadequate review,
- was disapproved by more than one study section member,
- is especially relevant to Branch's program.
o Discuss the proposals one at a time for one half hour. Then ratify review panel score or modify proposal and rescore.
o Members bring up any other proposal they wish to discuss
o Over 95% of proposals ratified en bloc.
o Council meeting chaired by Institute Director.
Allocation of Institute budget to projects.
o If proposal turned down, take comments of program director (if offered) and revise application. Then resubmit.
o Set pay limits.
o Pay grants in priority score order.
Monitoring and supporting ongoing projects.
o Site visit every 8 to 9 months.
o Mail each grantee a questionnaire three times during grant: with his application form, six months after start, and at the end. Questionnaire asks him where his results are useful, and how they will be implemented.
Evaluation of project outcomes.
o Rate Institute's performance using standard form. Issued by program directors.
o Branch staff rates completed projects on a four-point scale. Used as check on monitoring.
Implementation of results.
o Investigators are required to include a tentative plan for diffusing project results in the project proposal.
o Investigators are expected to take some action toward disseminating or diffusing the results of their project.
o Supplementary utilization grants can be stimulated if needed.

Figure 10: Structural Relationships in the Mental Health Services R&D Branch



Staffing Relationships

Program Directors. Most program directors have an M.D. or a Ph.D. degree. They are selected by the Mental Health Services R&D Branch Chief, and approved by the Director, Division of Mental Health Services Programs. Each is assigned responsibility for a program area and works almost full-time in that capacity. The program areas are defined so that most overlap substantially with at least one other program area. This way intrastaff dialogue is increased and greater flexibility in shifting manpower to priority problems is obtained. The program areas have been clustered into four groups, with each program director rotating through a six-month term as group coordinator. This also helps the program directors to learn other problem areas. The job of branch coordinator is filled jointly by the branch chief and the staff man responsible for Grants Review Administration.

Review Panel Members. The branch chief recommends replacements for panel members from the community of researchers and practitioners when their four-year term expires. These nominations are then approved up the line to the Secretary of HEW. The branch chief serves as chairman of the review panel and chooses a co-chairman from the panel.

Since the range of disciplines and problems covered by each panel is large, nominating panel members is a difficult job for the branch chief. In general, the best policy is to select two or three panelists from each discipline frequently relevant to the program, and at least two or more practitioners. It is especially important to have two or more extremely strong methodologists on the panel.

National Advisory Mental Health Council Members. At least six are required by law to be authorities in mental health or science fields important to the Institute's concern. Two are *ex officio* representatives, one required from DoD and the other from the Veterans' Administration -- and as selected they tend to be scientists. Of the remaining six positions, one or two are usually lay representatives and the rest scientific. Advisory Council members are nominated by the Institute Director and approved up the line to the Secretary of HEW.

IV. OFFICE OF ECONOMIC OPPORTUNITY

OVERVIEW

Like the Department of Agriculture and the National Institute of Mental Health, The Office of Economic Opportunity (OEO) supports both R&D and an action program in carrying out its mission, and like these agencies, the action part of the total program is larger than the research part. In the federal hierarchy, OEO is part of the Executive Office of the President. In FY 1971, OEO spent $100 million on R&D, and $794 million on action programs, mostly on community action agencies and demonstrations.

The budget for action programs is smaller now than it used to be. This shift occurred in 1969, when the President announced a reorganization of OEO. His policy was to have OEO concentrate on developing and testing new action programs, and move away from the operation and implementation of action programs. Once shown to be successful, new programs would be transferred to other federal agencies. In addition, OEO would assume a larger role in analyzing domestic policy issues pertaining to the poor. Thus, OEO was to have a dual role: staff to the Executive Office of the President on policy issues, and producer of verified, new programs.

OEO's Office of Planning, Research and Evaluation (PR&E) plays a significant part in this strategy, since it is a principal R&D arm of OEO. In FY 1971 PR&E spent $26 million on R&D. Although other OEO units conduct R&D, their primary activity is arranging pilot programs and demonstrations, and not conducting R&D. The paradigm presented in this section will center on the PR&E part of OEO.

The other major divisions of OEO are the Office of Operations ($360 million), Office of Legal Services ($62 million), Office of Health Affairs ($100 million), and the Office of Program Development ($52 million). The Office of Operations runs OEO's Regional Offices and the Community Action Agencies funded by Title II of the OEO Act. It has a small decision-oriented research activity for dealing with service delivery problems. The Office of Legal Services has some

research funds ($5 million), which are used for decision-oriented research, preparation of briefs for operating offices, and a university center. The Office of Health Affairs is primarily involved in demonstrations. The Office of Program Development (OPD) is functionally closest to PR&E. Its primary method of operation is to conduct "pattern" demonstrations and follow up with rigorous evaluations. The intention is to plan these demonstrations so that several together will contain a pattern of variations that together constitute an experiment. OPD tends to be more entrepreneurially and less conceptually oriented than PR&E carrying out its developmental activity.

The Office of Planning, Research and Evaluation has pioneered in the use of carefully planned and evaluated social experiments as a means of conducting R&D on social problems. While the idea of social experimentation is a simple application of empirical scientific methods, its use in testing social programs is new and still under development.

In accordance with this way of conducting R&D and its dual staff and developmental role, PR&E has been organized into three groups: Experimental Research, Policy Research, and Evaluation. Each of the groups has about twenty people. They spent, respectively, $16 million, $5 million, and $5 million in FY 1971. Another reason for grouping the staff this way is that it puts people of like mindset together.

The Experimental Research group views its job as designing an interesting and important policy-relevant experiment and getting it going. Their operating style is much like OPD's.

The task in the Policy Research group is to do research into the underlying causes of poverty. Some "basic" work is supported (in particular, a university center for poverty research), but in choosing problems and approaches the Policy Research group's style is more policy-oriented than typically found in academic research. To a great degree, the staff is free to choose its own topics of research. The purpose of having this staff is to be able to produce relevant policy analyses on short notice. The PR&E Director believes that the probability of doing this kind of work before it is needed,

and having it end up right on the mark, is nearly zero. He believes that the only way to get good policy analyses done on a crash basis is to have an intramural staff that spends most of its time doing research. When an issue gets hot, someone on the staff will know what is known about the issue, and likely have given it some thought. This person will then be able to produce a relevant policy analysis in a short time.

The task in the Evaluation group is to determine how well something is working and what impact it is having. They are somewhat less concerned with why something works than is Policy Research, but not to the extent that reasons why a program is or is not working are avoided. On the contrary, Evaluation believes that diagnostic information is of much more use to decision makers than purely impact analysis.

The Evaluation group is less concerned with getting something to work than is Experimental Research and more concerned with executing complete designs that will hold up under counterexamination.

Evaluation is concerned with the integrity, accuracy, and completeness of experiments and results. More than the other groups, Evaluation's mode of operation is to bring pieces of work to a conclusion, summarize the results, and distribute them widely.

The essential features of PR&E's paradigm, which will be called the Research and Evaluation paradigm, are the following:

- *Work is performed on a project basis.* A wide range of performers are supported including private firms, nonprofit research institutes, practitioners, and academics.
- *Most project ideas are generated* internally by intramural staff and contracted out for performance.
- *Proposals are evaluated* with a system of *internal committees.*
- The organization plays a dual role: external as staff to the Executive Office of the President, and internal as developer and tester of new social action programs.
- *Management emphasis* is placed on *conceiving sound and*

policy relevant experiments and evaluations and carefully managing their performance.

SUMMARY

General Characteristics

Primary output:	Evaluated and tested solutions to selected social problems.
Mechanism of support:	Finite duration contracts are awarded to the winner(s) of an RFP competition. On some projects three semi-finalists are selected for Phase I contracts (design phase), and one of these is selected for the Phase II (production phase) contracts.*
Managerial emphasis:	Most of the managerial effort is placed on conceiving and designing sound, policy-relevant evaluations and experiments.
Staffing plan:	Research and Evaluation unit of OEO consists of three staff groups: Evaluation, Exploratory Research, and Policy Research. Members of each group serve full-time in their positions, but there is a lot of staff interaction.

Program Planning

Source of new ideas:	Program ideas are generated by the Research and Evaluation staff,

*This feature is only being used on an experimental basis.

particularly its Director and the Policy Research group. The Director derives many of his ideas from service on presidential level policy task forces.

Mechanism for planning: The Policy Research group does research and maintains links into the research community so that it will remain a source of fresh and sound ideas.

Coordination: Plans for new programs are coordinated through informal contact at the program director's level, and by the Director. The Director can be especially effective in coordinating programs because of his service on presidential level task forces.

Program Development

Source of project ideas: Within a program, project ideas are generated internally by the Research and Evaluation staff. Project ideas are then developed to an outline or "rough design" stage by a project management team of two or three staff professionals. The outline is written into an RFP by the project team.

Allocation of budget to projects: Budget decision is in effect set by an inhouse panel (Project Review Board), which must authorize the writing of an RFP, and the Director of PR&E, who authorizes the creation of project teams.

Evaluation of proposals: Bids received in response to the RFP

are reviewed and scored by an ad hoc technical review panel of mostly inhouse personnel. The winning contractor is selected by top-level OEO managers in consultation with project personnel.

Monitoring of performance: Especially during the design phase, the project management team works very closely with the contractor to make sure the desired product will be obtained.

Evaluation of outcome: The project team writes a report on each contractor that is used in evaluating subsequent proposals.

Program Evaluation

Mechanism of evaluation: No formal procedures.

ACTIVITIES

In discussing the detail of program management activities, attention will sometimes focus on the Evaluation group, to the exclusion of similar functions done by the other two groups in PR&E. This simplification distorts the PR&E paradigm, but only slightly for three reasons. First, the procedures used in Experimental Research are qualitatively similar to those used in Evaluation even though grants insteads of contracts are used. Second, since the primary responsibility of Policy Research is policy analysis, discussion of how this is done would be irrelevant to the topic of managing practice-oriented R&D. Third, where the operations of these three groups strongly interact, as in program planning, the role of all three will be discussed.

At this point discussion will turn to the methods used for program planning in the Evaluation group of PR&E.

Program Planning

The Evaluation group conducts five kinds of evaluation projects:

- o *Evaluations of experiments* conducted by the Exploratory Research group.
- o Impact *evaluations* of major national *programs*.
- o *Comparative evaluations* of different ways the same job is being done (natural experiments).
- o *Analysis of data* collected on other programs by other agencies.
- o Extremely *short term analysis* of questions asked by other agencies in the Executive Office of the President or OEO.

There is no subject area restriction other than to the needs of the low-income population. Programs in housing, manpower, education, health, or welfare may be evaluated.

The Evaluation Group has no explicit rationale for generating new evaluation program and project ideas and choosing which to develop, except that at a minimum every one of PR&E's experiments is evaluated. There is no attempt to develop a long-range plan. Nevertheless, all program and project ideas that are eventually developed originate in the Evaluation group or in another part of PR&E. Therefore, the long-run effectiveness of the Evaluation group depends strongly on the quality of the ideas that the whole PR&E staff generates and its ability to choose wisely among them in selecting the few that are developed into projects. In the long run, the quality of the ideas generated and of the choices made among them depends upon:

- o The background and quality of the staff.
- o The steps that management takes to encourage staff interaction, and
- o The contacts that staff have with the external environment.

External Contacts. One primary set of contacts is provided by OEO's position in the Executive Office of the President (EOP). Because of this position, the Director of Research and Evaluation is called to serve on

policy task forces and consult with personnel in the White House, Office of Management and Budget, and other EOP organizations. These contacts affect the Director's priorities among problems and are a source of new ideas that he translates into new programs.

Another external contact is provided by a managerial policy to maintain sufficient intramural capacity within the Evaluation group that data collected on programs sponsored by other agencies can be analyzed internally. Often these analyses produce new results and sometimes lead to ideas for new programs.

A third set of contacts is provided indirectly through the Policy Research group. As mentioned previously, one of the Policy Research staff's activities is to do research into the underlying causes of poverty. Since the knowledge base is weak in this area, the staff works in an exploratory mode much of the time by thinking through novel ideas, and by keeping in contact with what is going on in their specialty. One means of contact is traveling frequently throughout the social research world. Another is to arrange research grants with extramural researchers,* and use them as consultants and taps into the research community. As a product of these contacts and their own research, the Policy Research staff generate ideas for new programs. Since the whole Research and Evaluation operation is small (less than 80 people), the Policy Research staff can interact frequently with the Director and with members of the Evaluation staff, and communicate these ideas directly to the people who can implement them.

The Policy Research staff is an especially good source of program ideas, because their overriding objective is doing sound policy analysis on short notice. To produce sound analysis, the Policy Research group must know and develop knowledge about which are the most sensitive and crucial system variables. Thus, their ideas are tempered by knowledge of what is likely to have the most effect.

To assure that this idea generation and research function of the Policy Research group is not lost to pressures for more policy analyses, the PR&E Director carefully regulates the number of requests for analyses given to Policy Research staff. The overflow of requests

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*OEO has authority to award both contracts and grants.

are given to the Policy Analysis staff, a small group of generalists who report to the Director of PR&E and are capable of doing analyses on short notice. This staff typically numbers four or five professionals* with backgrounds in a variety of fields such as law, economics, or history. This staff is distinguished by its ability to do analysis on a wide range of topics on short notice. The PR&E Director believes that the availability of such a staff, which acts as a buffer for the Policy Research group, is essential to PR&E's long-run ability to generate new ideas and maintain its research base.

Staff Interaction. The idea generation and filtering process is also enhanced by the deliberate, managerial policy of maintaining differences between the perspectives taken by the three Research and Evaluation groups, and on frequent occasions, bringing them together to work on common problems. The perspective in Policy Research is knowledge-oriented and decision-oriented. They are concerned with what is known and what needs to be known. The perspective in Experimental Research is to get some experiments going, and produce results even if it means some sacrifice in methodology. The perspective in Evaluation is to press for changes that would improve the quantity and integrity of measured experimental results. During the formative stages of new programs, the Director of PR&E brings together staff from each of these groups. The complementary nature of the dialogue produced serves to keep all parties open to new alternatives, and helps each recognize oversights. The result is better quality program ideas and formulations. The Director makes sure that this process operates by resolving issues at his level. He forces interaction among all the parties involved, and does not allow insular agreements to build up at the working levels.

Since the rest of OEO is organized by problem area and PR&E is organized by research function, there is also a difference of view between PR&E staff and the rest of OEO. This differential minimizes the chances that PR&E becomes tied in thought to existing operating programs.

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*The Policy Analysis staff is just being instituted in PR&E.

Staff Quality. The third means of enhancing the idea generation and selection process is to maintain quality and diversity in the three PR&E staff groups.

The Evaluation staff consists half of historians and sociologists and half of statisticians, systems analysts, and operations researchers. A few of the staff specialize in one type of evaluation or subject area, but most do not. A few specialize in doing the short-term analysis of questions posed by other agencies, because this type of work takes special skills. The Policy Research staff are mostly economists, but some are sociologists, psychologists, political scientists, and computer scientists. They tend to specialize in subject areas, for example, housing. The Experimental Research staff also have academic backgrounds, but are less research-oriented and more engineering-oriented in their desire to construct and investigate in an empirical way. Most have a social science background.

While the phrase, program idea, has been used to this point in discussing the planning process, in actuality programs do not exist in PR&E as managerial entities. Programs could be defined by sorting projects in the three PR&E groups into categories of related projects, but there is no managerial recognition of programs as such in the assignment of managerial responsibility or budgeting. Rather, idea formulation occurs at the project level, where a project is a contractable unit of work to be managed by one of the three PR&E groups. Projects may be strongly related, as is the case when an experiment and an evaluation are coupled, but such a strong coupling does not always exist. More usually project ideas are generated sequentially in the course of elaborating a central theme. Thus, an effort to understand the role of incentives in the delivery of health care might include projects on income maintenance, various forms of insurance, physicians' fee adjustments, and others done over a period of time. Successive projects would be devised by the PR&E staff to articulate the variations and aspects of the central theme with the purpose of understanding it more clearly. By the nature of social experimentation and evaluation many of these projects take several years to complete and are very large in size, sometimes up to several millions of dollars. At any one time only a few will be supported.

Because of this large size and the form of program organization, it is very difficult to sort management activities into the categories, Program

Development, which involves elaborating current themes, and Program Planning, which involves generating new themes. In PR&E, the processes used to decide what the next round of projects will be in Program Development are indistinguishable from the way new themes are generated.

This ambiguity will be avoided by reassigning the project idea generation stage of Program Development to Program Planning. Thus, Program Development will include only the activities of taking a project idea, developing it into a set of tasks, performing the work, and reviewing the outcome.

Program Development

For the first three kinds of evaluation projects that the Evaluation group does -- experiment evaluations, program evaluations, and comparative evaluations -- the Program Development process consists of four sequential phases:

- o A *preliminary phase* where OEO decides what the evaluation design should be;
- o *Phase I*, the design phase, where the contractor finalizes the evaluation design;
- o *Phase II*, the production phase, where the evaluation is carried out; and,
- o A *follow-up phase*, where additional analyses of data and dissemination occur.

The last two kinds of evaluations done -- data analyses and short-term policy analyses -- are performed intramurally by the Evaluation group staff. Usually, these go through the same four phases, but the management control process is much less formal than for the first three kinds of evaluations since the latter are all performed extramurally. In what follows, discussion will be limited to managing the first three kinds of evaluations.

In general, PR&E lets one contract for both Phases I and II of an evaluation project. At the present time, however, PR&E is experimenting with the procedure of awarding several Phase I contracts, and a separate contract for Phase II to the best of the Phase I contractors. The two-phase procedure is intended to provide additional incentive for the contractors to cooperate

with the project team during the evaluation design phase. A high level of cooperation is felt to be exceedingly important for best results. The procedure also gives additional information about the capability of the contractors to perform before the final commitment of the bulk of project funds must be made. In describing Program Development this Phase I/Phase II procedure will be included as an option that PR&E sometimes uses even though it is only in an experimental stage of development because it illustrates the importance PR&E places on getting contractors to work with the project team.

The Preliminary Phase of project development is carried out intramurally by a team of at least two people. The same two people generally follow a project through the first three phases. At least one of these people is an analyst, and at least one is a subject-knowledgeable person. The team sometimes uses consultants for short periods to cover gap areas. Sometimes exploratory surveys are done. The Preliminary Phase lasts from two to four months depending on the complexity of the project, and other factors. The preliminary phase must begin well before the experiment or program to be evaluated begins if preintervention data are to be collected. Since the Phase I contract (on which the evaluation design is finalized) lasts between a few months to a year, the Preliminary Phase must begin more than half a year earlier, or roughly a year or more before the intervention starts. For example, on OEO's Voucher Experiment scheduled to begin in September 1972, the Phase I evaluation contract will probably be let by October 1971, so that Phase I can be finished by January 1972, and a contractor selected for Phase II by February 1972. Preintervention data will be collected in April 1972 by the Phase II contractor. To fit this time schedule, the Preliminary Phase had to start in April 1971, a year and three months before the experiment.

The purpose of the preliminary phase is to answer four questions:

- What is to be found out?
- How can it be found out?
- Who will use the results?
- About how much will it cost?

Because the reason for doing an evaluation is to develop information for decisionmakers, and *not* to do research, the team spends most of its time on two of these questions: Who will use the results, and how can these be found out? On the question of "what is to be found out," the team tries hard to separate the "nice" kind of things to know from the essential things to know -- the information decisionmakers can use. The "how" question includes questions such as: Is a national sample necessary, or will a selected site be enough? Must evaluations be done before, during, and after the intervention to get usable results, or is a post-experiment evaluation sufficient? Will a pattern of demonstrations suffice, or is a controlled intervention required?

The project team determines answers to these questions and incorporates them in an RFP for the evaluation project. The project team works hard in perfecting the RFP, for sometimes as many as five or more versions are written before a final product is obtained. Successive versions are critiqued for technical substance and terms of contract by the Director of Evaluation, or the Director of PR&E, or both, depending on their interest in the problems. The final product specifies the evaluation design in outline form, the criteria to be used in evaluating proposals, and the weight in numerical score that each criteria will have in selecting the winning contractor(s).

PR&E's process for reviewing RFPs and proposals begins with a management-oriented review that occurs before RFP-writing begins in earnest. This review is conducted by the Project Review Board, a standing committee consisting of the PR&E Director, ten PR&E staff members selected by him, one representative from the General Counsel's Office, and one from the Procurement Office. The purpose of this review is to check that the necessary funds have been budgeted and that the estimated cost is appropriate for the proposed project. The Board also determines if a contract is the appropriate instrument and what the terms of contract should be (cost plus fixed fee, or fixed price, or some other terms).

If the estimated project cost is over $300K, an ad hoc Procurement Evaluation Board is convened near the end of the preliminary phase to review the final drafts of the RFP. The Board is responsible for reviewing the criteria to be used in selecting the winning contractor(s), and developing

an instrument for evaluating proposals with respect to the criteria. The instrument is a detailed list of questions that proposal evaluations will use in assigning scores for each criterion. The purpose of the Board's review is to increase the assurance that the winning contractor(s) will be selected impartially. The Board members are selected by the Deputy Director of OEO. Included are the Director of Procurement, the project team leader, and an agency-wide cross section of seven to ten senior-level staff people.

If the estimated project cost is less than $300K, the process for reviewing the criteria to be used in evaluating bidders is less formal. Instead of convening a Procurement Evaluation Board to accomplish this review, it is done by PR&E top management at the same time they are reviewing the final versions of the RFP for substance.

Whether the estimated cost is over or under $300K, the final version is reviewed for its technical substance and legal conformity by OEO managers, specifically the Director of PR&E, the OEO General Counsel, and the Director of the Procurement Office. If the RFP is acceptable to all of these reviewers, the Director of PR&E releases it for inclusion in *Commerce Business Daily*. In addition to this means of distribution, the RFP is also sent directly to individuals or firms that the PR&E management or staff think would be exceptionally able performers.

Proposals received in response to the RFP are evaluated with a committee review system. If the estimated project cost is over $300K, the Procurement Evaluation Board, the same panel that has reviewed the RFP, does the first level review. If the estimated project cost is less than $300K, a Procurement Evaluation Board is convened to perform the first level review. The panel members are chosen by the project team leader with the concurrence of the Procurement Office. Included are the contracting officer for the project, senior-level staff people from throughout the agency, and sometimes a few from outside OEO, either government or non-government.

The Procurement Evaluation Board members rank the proposals on technical merit according to the criteria set in the RFP. The exact procedures used for assigning scores are not standard but as a general rule each RFP is read and scored by four Board members. The proposal's technical merit score is the average of its reader's scores. On over-$300K projects, the Board members are guided in assigning scores by the list of questions developed

during the RFP writing stage. On under $300K projects, the Board operates less formally by giving greater discretion to the Board members in assigning scores. Board members are not left entirely to their own, however, because the Board does reach some agreement on guidelines that members will use in assigning scores.

After technical scores have been assigned the Board sees the cost portion of proposals for the first time. The Board then determines which set of projects are in the "competitive range." The competitive range is a vaguely defined concept, but roughly consists of those proposals which are high in technical merit but not too high in cost. The Board reaches agreement on what range of technical scores and costs constitute the competitive range through consensus agreement. On the average about five bidders are included but sometimes ten or more are included, especially on expensive procurements. The technical rating of particular proposals may be reassessed during this time.

The bidders in the competitive range are then invited in to discuss the strengths and weaknesses of their proposals with the project team and the Director of Evaluation, and with the Procurement Office. During these meetings the project team and the Director of Evaluation are able not only to exchange information of technical substance but to assess the sincerity and commitment of each bidder. The Procurement Office gives bidders until a predetermined date to revise either or both their cost or technical proposals.

Revised cost and technical proposals received from these bidders are then rescored and re-evaluated by the Procurement Evaluation Board as its final determination of rank order according to technical merit. For this evaluation each proposal is read and scored by each Board member.

If the estimated project cost is under $300K, the final decision on which contractor (or contractors if the Phase I/Phase II device is being used) is made by the Director of PR&E but he relies to a great extent on the opinions and judgments of the project team leader and the contracting officer for the project. In general, contracting officers tend to favor the lower cost proposals in the competitive range, and project team leaders the technically most meritorious in the competitive range creating a tension

between them that is resolved by the Director of PR&E. In making his choice the Director of PR&E is also influenced by the Director of Evaluation.

If the estimated project cost is over $300K, the final decision on winners is made by the *Source Selection Board*. This Board consists of the Deputy Director of OEO, the Director of PR&E, and the General Counsel. The Board hears a presentation by the project team leader summarizing the results of the Procurement Evaluation Board deliberations. Both the Procurement Evaluation Board's findings in determining which bidders were in the competitive range and their findings on revised proposals from bidders in the competitive range are included. After discussion the Source Selection Board reaches a consensus decision on the winning contractor(s). If the Phase I/Phase II procedure is being used, the Board decides how many Phase I contracts will be awarded.

Evaluation contracts are very closely monitored during their performance. A $1 million evaluation will be managed full-time by a two- or three-man team, especially during the design phase. Usually, it is the same team that wrote the RFP. The project team works closely with the contractors in developing questionnaires, and site-visits both the contractor and the data sites. The project team is very active and aggressive in managing evaluation contractors so that the final product will satisfy OEO's needs. PR&E believes that close monitoring is essential to obtaining results that decision makers can use.

If during the course of an evaluation project a major change in contract rules or scope is desirable, this need is reviewed by the Project Review Board and then negotiated with the contractor.

If the Phase I/Phase II procedure is being used, each of the Phase I contractors submits a proposal for Phase II at the end of Phase I. The Phase II proposals are evaluated using the same committees and system of review used for Phase I.

At the end of an evaluation project the contractor writes a final report that is released by PR&E for public consumption. The contractor also submits all the data collected on the project. These data are made available for researchers who have use for it.

Completed projects are disseminated in two ways. The contractor submits a final report on his findings that is then released. The project team also writes a report that summarizes the policy relevant findings and indicates where additional study is needed to get additional policy relevant results.

Sometimes a grant or contract is awarded for this additional study. Either the evaluation project contractor, if he performed well, or another contractor may be selected for this work. Otherwise, the additional study is done by the Evaluation staff. The need to do additional studies is not indicative of a poorly-designed evaluation, or poor performance. Sometimes policy questions arise during the course of performance that were not foreseen at the beginning.

OEO's evaluation results are strongly coupled into policymaking because of its position in the Executive Office of the President. Since the Director of Research and Evaluation serves on task forces and consults with White House and OMB people on a regular basis, he carries evaluation results directly to decisionmakers. This is an important feature of the OEO Research and Evaluation paradigm.

Within sixty days after the close of an evaluation contract, the project team evaluates the contractor's performance and submits a report to OEO's procurement division. These reports are stored, and recalled later for use by review panels when the contractor applies for another contract.

A diagram of the program development process appears in Figure 11.

ORGANIZATION

Organizational Relationships

OEO's Office of Planning Research and Evaluation is formally composed of three units: Experimental Research, Policy Research, and Evaluation. These groups are actually only loose confederations of specialists doing a similar job, and are not highly compartmentalized. There is a great deal of interplay between the staffs. A chart of OEO appears in Figure 12.

Figure 11 : Program Development for OEO Evaluation

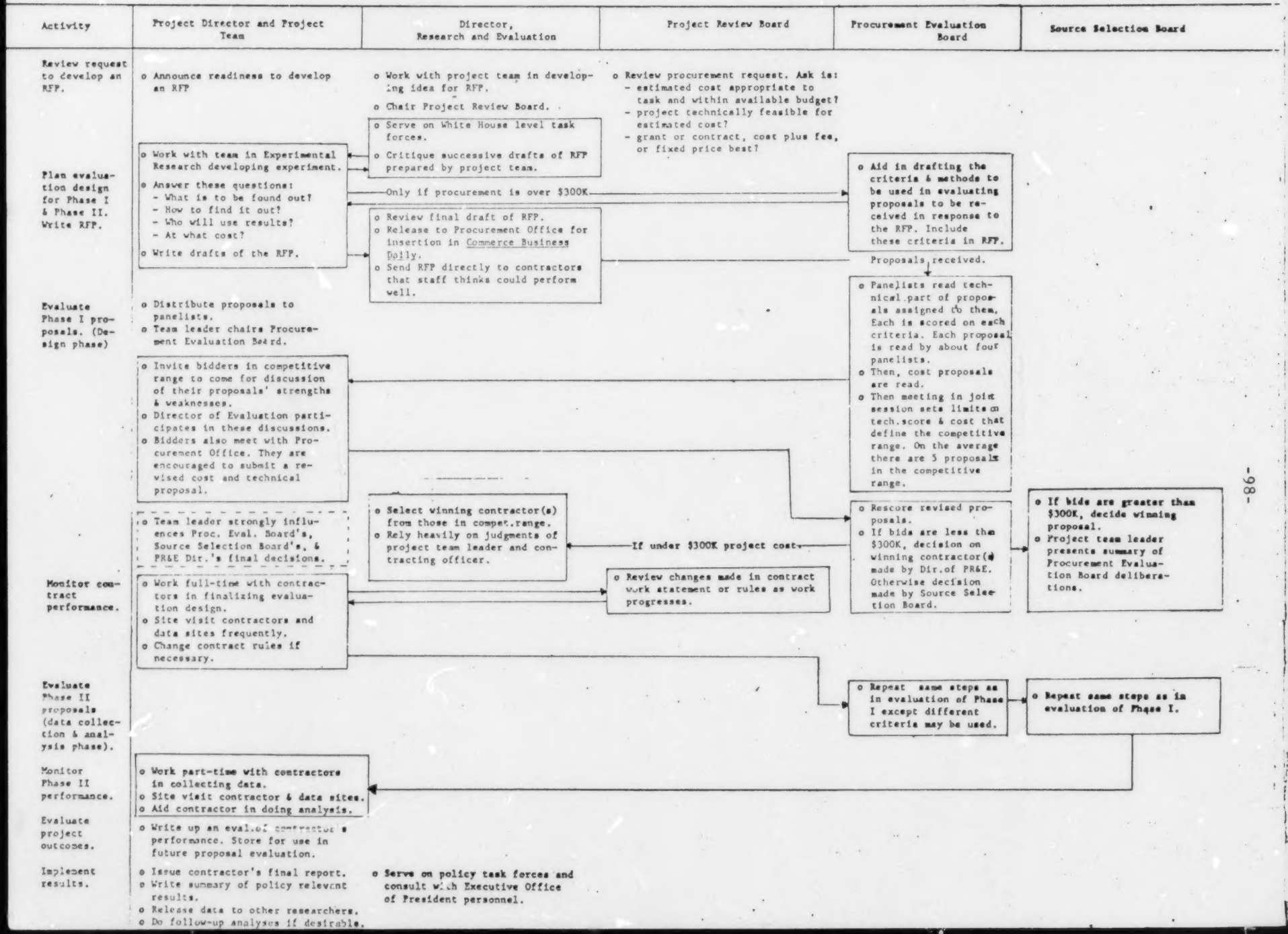
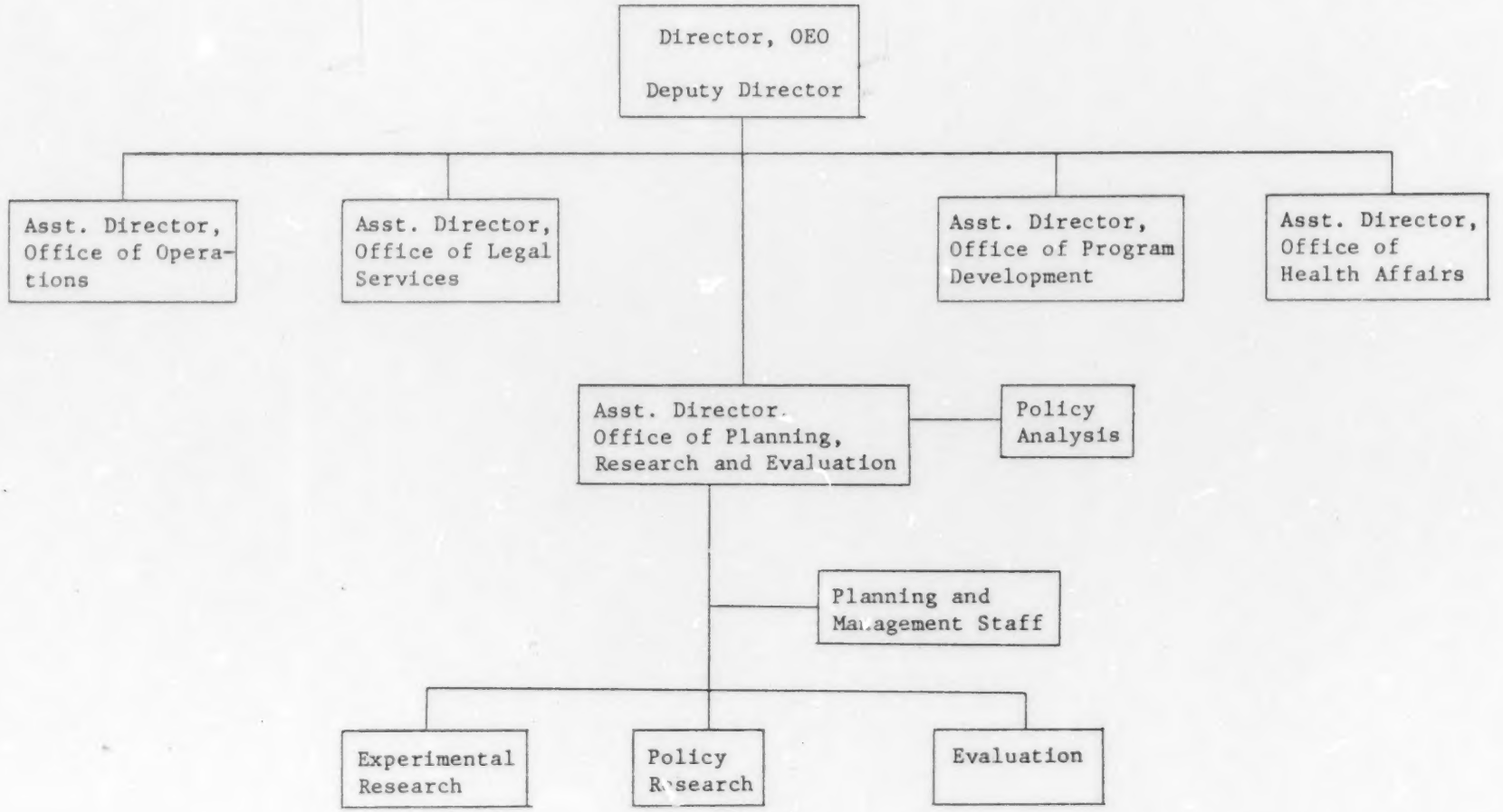

Activity
Project Director and Project Team
Director, Research and Evaluation
Project Review Board
Procurement Evaluation Board
Source Selection Board
Review request to develop an RFP.
o Announce readiness to develop an RFP
o Work with project team in developing idea for RFP.
o Chair Project Review Board.
o Review procurement request. Ask is:
- estimated cost appropriate to task and within available budget?
- project technically feasible for estimated cost?
- grant or contract, cost plus fee, or fixed price best?
o Serve on White House level task forces.
o Critique successive drafts of RFP prepared by project team.
Plan evaluation design for Phase I & Phase II. Write RFP.
o Work with team in Experimental Research developing experiment.
o Answer these questions:
- What is to be found out?
- How to find it out?
- Who will use results?
- At what cost?
o Write drafts of the RFP.
Only if procurement is over $300K
o Aid in drafting the criteria & methods to be used in evaluating proposals to be received in response to the RFP. Include these criteria in RFP.
o Review final draft of RFP.
o Release to Procurement Office for insertion in Commerce Business Daily.
o Send RFP directly to contractors that staff thinks could perform well.
Proposals received.
Evaluate Phase I proposals. (Design phase)
o Distribute proposals to panelists.
o Team leader chairs Procurement Evaluation Board.
o Panelists read technical part of proposals assigned to them. Each is scored on each criteria. Each proposal is read by about four panelists.
o Then, cost proposals are read.
o Then meeting in joint session sets limits on tech. score & cost that define the competitive range. On the average there are 5 proposals in the competitive range.
o Invite bidders in competitive range to come for discussion of their proposals' strengths & weaknesses.
o Director of Evaluation participates in these discussions.
o Bidders also meet with Procurement Office. They are encouraged to submit a revised cost and technical proposal.
o Team leader strongly influences Proc. Eval. Board's, Source Selection Board's, & PR&E Dir.'s final decisions.
o Select winning contractor(s) from those in compet. range.
o Rely heavily on judgments of project team leader and contracting officer.
If under $300K project cost.
o Rescore revised proposals.
o If bids are less than $300K, decision on winning contractor(s) made by Dir. of PR&E. Otherwise decision made by Source Selection Board.
o If bids are greater than $300K, decide winning proposal.
o Project team leader presents summary of Procurement Evaluation Board deliberations.
Monitor contract performance.
o Work full-time with contractors in finalizing evaluation design.
o Site visit contractors and data sites frequently.
o Change contract rules if necessary.
o Review changes made in contract work statement or rules as work progresses.
Evaluate Phase II proposals (data collection & analysis phase).
o Repeat same steps as in evaluation of Phase I except different criteria may be used.
o Repeat same steps as in evaluation of Phase I.
Monitor Phase II performance.
o Work part-time with contractors in collecting data.
o Site visit contractor & data sites.
o Aid contractor in doing analysis.
Evaluate project outcomes.
o Write up an eval. of contractor's performance. Store for use in future proposal evaluation.
Implement results.
o Issue contractor's final report.
o Write summary of policy relevant results.
o Release data to other researchers.
o Do follow-up analyses if desirable.
o Serve on policy task forces and consult with Executive Office of President personnel.

Figure 12 : Organization Chart of OEO



A Director has been chosen for the Exploratory Research group and for the Evaluation group, but the Director of Research and Evaluation leads the Policy Research group.

The Director of PR&E is also served by two other small groups: the Policy Analysis staff* and the Planning and Management staff. The Policy Analysis staff is responsible for handling requests for policy analysis on short notice when the needed competence is missing in the three main functional groups or their workload is too great. The Planning and Management staff performs the administrative, budget, and operational planning tasks that PR&E needs to have done.

Project Review Board. The Director of PR&E chairs this Board and chooses approximately ten (the number varies over time) PR&E senior staff as members. Generally, these senior staff are in the GS-15 salary range. In addition a representative from Procurement Office and the General Counsel's office, chosen by these offices, also serve. This is a standing Board.

Procurement Evaluation Board. The Deputy Director of OEO chooses between seven and ten senior-level staff to serve on this Board. One of these members is the evaluation project team leader. In addition, someone from the General Counsel's office and the Procurement Office also serve. A new board is chosen for each procurement reviewed.

Source Selection Board. The Source Selection Board consists of the Deputy Director of OEO, the Director of PR&E, and the General Counsel of OEO.

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*This staffing function is not yet fully implemented in PR&E.